RUBBER WORLD

Season's Greetings

DECEMBER, 1959

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RUBBER WORLD

ARTICLE HIGHLIGHTS

BILL BROTHERS PUBLICATIONS

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VOLUME 141, NUMBER 3 DECEMBER, 1959

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The opinions expressed by our contributors do not necessarily reflect those of our editors

FEATURE DEPARTMENTS

Merry Christmas and Happy New Year

from the Philblacks* and the Philprenes*

*A trademark)

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NEWS of the RUBBER WORLD

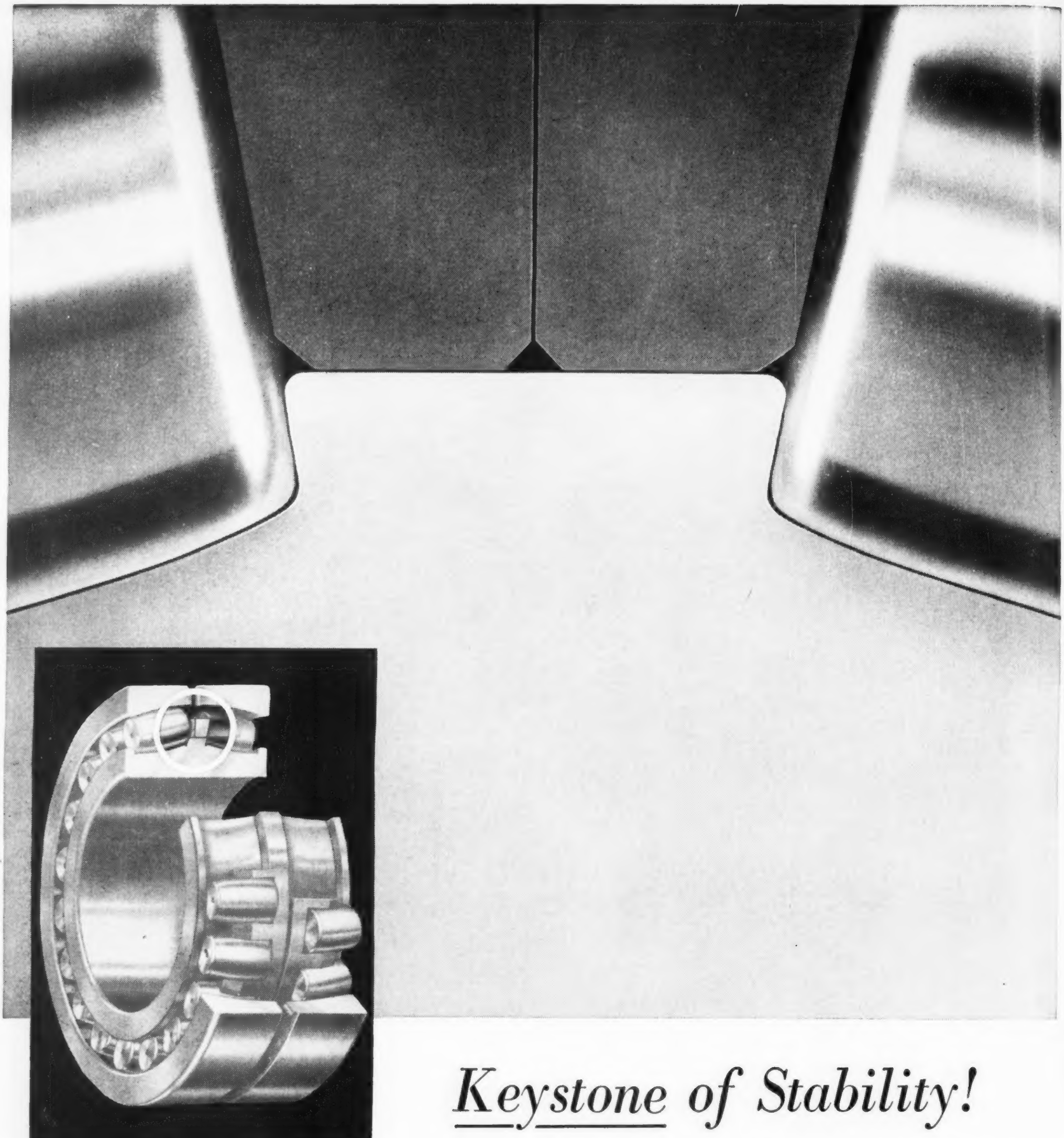
RUBBER WORLD'S super rubber trees, reported on this page last month, are a result of error and should be corrected. The gremlins were working overtime on the report of this Natural Rubber Bureau story. Test-tube trees now being developed may yield a very respectable 2,500 POUNDS per acre per year, but will undoubtedly fail to yield the 25,000 TONS per year per acre as reported.

Further inroads by synthetic latex into the foam rubber market were predicted by Goodyear in an announcement of a new SBR latex capable of producing foam and foam articles without the addition of any natural latex. Coming during this period of world shortage of the natural product, the announcement caused considerable interest.

Two rulings in the running campaign between the Justice Department and the rubber industry were made recently. In one, a Federal judge accepted a plea of "nolo contendere" by RMA and 10 belt manufacturers and fined them a total of $177,500 in spite of Justice objections. The other ruling, by an FTC examiner, dismissed charges against three tire companies that they conspired with oil companies to coerce dealers to sell the rubber company's products.

Plans to strengthen the Malayan rubber industry were presented to the Malayan Rubber Fund Board by Sir Geoffrey Clay. Based partly on his recent tours of Britain and the United States, the plans call for reorganization of the research units and stress technical service.

Another new research complex in a parklike setting has been established. Esso Research & Engineering Co. held dedication ceremonies for the first units of the center being established at Florham Park, N. J., which will house about 800 of Esso Research's 3,000 employes.



PLIOFLEX PORTFOLIO COVER

first edition!

portfolio

on PLIOFLEX

—7 pages of idea-sparking product news about America's most popular synthetic rubber

GOODYEAR

CHEMICAL DIVISION

Portfolio starts on next page

PLIOFLEX FOR HOUSEWARES

Photo courtesy Rubbermaid, Inc., Wooster, Ohio

New way to lighten overloaded budgets

Eye-catching color is a "must" in the manufacture of many products, but particularly so in rubber housewares. Equally important in the highly competitive housewares market is the matter of cost. Color opens the sale, but real quality at reasonable cost will always close the sale.

Notice how the housewares above–made by an established leader in the field–blend colorful good looks with readily apparent value. A key reason for their sales success: they contain PLIOFLEX 1713, new oil-extended synthetic rubber by Goodyear.

Used in combination with other rubbers, new PLIOFLEX 1713 was chosen by the firm for its excellent color characteristics, ease of processing, high uniformity and low odor level. What's more, it costs several cents less per pound than previously used polymers, yet can be compounded to maintain end product quality.

Perhaps new Plioflex 1713 can lighten your budget, too. For more information – plus latest *Tech Book Bulletins* on PLIOFLEX 1713 and a full line of synthetic rubbers and rubber chemicals–write Goodyear, Chemical Division, Dept. L-9418, Akron 16, Ohio.

GOODYEAR

CHEMICAL DIVISION

Plioflex–T.M. The Goodyear Tire & Rubber Company, Akron, Ohio

Photo courtesy Globe Rubber Products Corporation, Philadelphia, Pa.

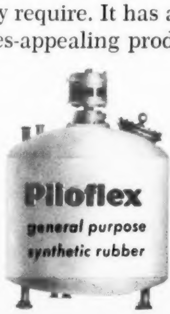
Fashion floor that's built for kicks

Spiked heels may be stylish on the foot, but they're "murder" on floors. Car floors, particularly, take a beating – not only from the pointed fashions of modern footwear, but from the constant pounding of foot-loose youngsters.

To take it, car floor covers or mats must be tough. And to sell, they must have color. One of the leading manufacturers in this field has found that PLIOFLEX, synthetic rubber by Goodyear, has the lasting qualities they require. It has also enabled them to make a more sales-appealing product at a substantial saving.

Want proof? Just look at the clean, crisp color of the floor mat above. Consider, too, the assured processability of PLIOFLEX *plus* its high uniformity and exceptional resistance to aging.

It all adds up to economical production of a sales-appealing product. To add appeal to *your* product without adding to your costs, check the advantages of PLIOFLEX. For full information–plus latest *Tech Book Bulletins* on PLIOFLEX and a full range of synthetic rubbers and rubber chemicals–write Goodyear, Chemical Division, Dept. L-9418, Akron 16, Ohio.



GOODYEAR

CHEMICAL DIVISION

Pliofiex–T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

PLIOFLEX FOR FLOOR COVERINGS

PROTOX®-267

It saves dollars!

You will save on unloading costs. You will save on storage costs. You will save on processing costs.

PROTOX-267 bulks about half that of conventional zinc oxides. A 50-pound bag occupies less than 1 cubic foot of space. It flows freely . . . can be weighed out faster. Long before the pigment enters your processing operation you can start counting your savings.

But the most important savings come from PROTOX-267's faster incorporation and dispersion in rubber. The unique coating* of zinc propionate on the pigment particles makes for rapid and thorough dispersion. There are no aggregates . . . no undispersed pigment . . . no spotty cures.

And keep in mind . . . PROTOX-267 is a member of the HORSE HEAD line of zinc oxides. That also makes it the *most uniform* zinc oxide you can buy.

Do you have the 24-page booklet on PROTOX zinc oxides? It's chock-full of facts every rubber chemist and purchasing agent should know. A post card will bring you a copy.

*U.S. Patent 2,303,330

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THE NEW JERSEY ZINC COMPANY

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TECHNICAL BOOKS

BOOK REVIEWS

"Linear and Stereoregular Addition Polymers: Polymerization with Controlled Propagation." Polymer Reviews, Volume II. By Norman G. Gaylord and Herman F. Mark. Cloth, 6¼ by 9¼ inches, 571 pages. Interscience Publishers, New York, 1959. Price, $17.50.

Gaylord and Mark have gathered together the work in this rapidly moving field up to the end of February, 1959, to form a timely and important text. The book covers background theory on adsorption on surfaces and complex formation; requirements for stereospecific polymerization; structure of olefin polymers in the solid state; solution properties of linear polyethylenes and isotactic polymers; Ziegler-type catalysts, their preparation, polymerization procedures, and theory of controlled propagation; Alfin catalyzed polymerizations; lithium metal and organolithium catalysts; fixed-bed polymerizations with supported chromium oxide and similar catalysts; polymerization of olefin oxides and physical properties of the polymers; physical properties of olefin polymers; and last, but by no means least, tabulated patent examples. The latter is an extremely comprehensive and well-ordered set of 26 tables describing the pertinent facts of the important foreign and U. S. patents in the field, arranged by monomer and catalyst type. To those who have struggled with the overwhelming flood of patent literature this is a most welcome relief.

In addition to this impressive list, the authors have included an up-to-the-minute (as of February 28) appendix of information, some of it gleaned from papers about to be published. The book covers most of the published work on the polymerization of new rubbers such as *cis*-1,4-polyisoprene and *cis*-1,4-polybutadiene. The polymers are characterized mainly by density. Some mechanical properties of the new plastics are tabulated.

This is an essential text for those doing polymerization research and a useful volume for all those concerned with the technical aspects of the new stereoregular polymers, both rubbers and plastics. Drs. Gaylord and Mark, and their publishers, are to be congratulated for a most significant contribution to the plastics and rubber industry.

N. R. LEGGE

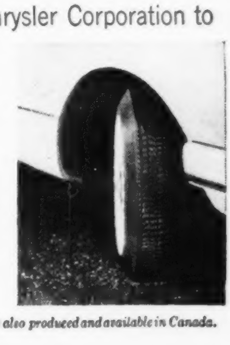
"The Synthetic Elastomers and Their Main Applications." G. D. Lefcaditis. 72 pages. Imprimerie Nestia, Athens, Greece. 1959.

This Greek-language publication describes the nature and the preparation of the various elastomers along with the properties and applications of their vulcanized compounds. The author, chief chemist of Karthea Rubber Mfg. Co., Athens, discusses both hot and cold polymerized SBR polymers including oil-extended grades and black masterbatches. He also has included sections on oil- and solvent-resistant rubbers, the Vulcollans, Adiprene, arctic rubbers, Hypalon, Kel-F, "Viton," and many other of the newer materials.

"Die Polarchemie des Kautschuks und der Kolloide. (The Polar Chemistry of Rubber and the Colloids.)" Heinrich Feuchter. Published by A. W. Gentner Verlag, Stuttgart, Germany. Paper-covered board, 6 by 8½ inches, 80 pages, illustrated. Price DM 12.00.

This little book develops the ideas presented in an earlier work, published in 1952, on the polar nature of rubber. The fundamental concept now discussed is the polarity of the bonding forces, conceived as a dualistic energy system involving the action of an energy and a counter energy, which is the efficient

TYREX*



cause of all natural occurrences. Since the immediate aim is to explain the enigmatical properties of the colloidal stuff of living matter, a special, purified rubber H, as prototype of the colloids, is the material used to study the effects of polarity. To illustrate his ideas, the author has worked out a structural geometry based on theoretical units he calls "enyls" from which in turn "cyclanes" are built. The general purpose of the book is to stress the importance of polarity and to stimulate interest in its possibilities.

NEW PUBLICATIONS

Publications of Dow Corning Corp., Midland, Mich.:

"Silicone Dielectric Gel." Bulletin 10-505. 4 pages. This illustrated brochure describes a new silicone potting material for electronic assemblies that permits visual and instrument checking of individual parts within the assembly. Besides tables of properties, the bulletin includes a graph which shows that no damaging stresses are exerted on delicate parts by this material either during or after cure.

"Fuel, Oil, and Solvent Resistance of Silastic." 4 pages. This study describes the three main groups of Silastic stocks on the basis of fuel, oil, and solvent resistance: fluorocarbon silicone rubber stocks, all other Silastic stocks (silicone rubbers), and blends of these two groups. Tables present the ratings of various types of Silastic in various oils, fuels, solvents and chemicals.

"Silastic 52." Silastic Facts 9-392. 2 pages. This data sheet describes typical properties of Silastic 52, a general-purpose, 50-durometer silicone rubber. Effects of various overcures and of heat aging on the properties of Silastic 52 are given. Silastic 52U (without the vulcanizing agent) is also described.

"Silastic 82." Silastic Facts 9-393. 2 pages. Silastic 82, a general-purpose, 80-durometer silicone rubber, is described, and its properties and applications are presented. Silastic 82U (without the vulcanizing agent) is dealt with.

"Silastic LS-63U." Silastic Facts 9-394. 2 pages. Typical properties and tentative specifications are given for Silastic LS-63U, an extrusion and calendering grade of fluorocarbon silicone rubber, resistant to fuels, oils, and solvents. Electrical properties, the effect of different oven cures, and oil and fuel resistance data are also presented.

"Universal Compression Testers." Testing Machines, Inc., Mineola, L.I., N. Y. Two new fully illustrated brochures describing the TMI Family of Compression Testers are now available from the company. The brochures describe how one of TMI line of Universal Compression Testers—combined with attachments—yields more information than any other single instrument. These testing machines can perform over 15 different tests. Illustrations of squeeze, squash, bend, yank, and jab applications are included.

"The Care and Service of Truck Tires." The Rubber Manufacturers Association, Inc., New York, N. Y. 40 pages. This booklet replaces the Association's two previous separate publications relating to tubed and tubeless truck tires. It has been prepared to serve as a guide to better service life from truck tires and tubes through proper care. Numerous illustrations and some graphs are included.

"Borden's Chemicals, Polymers, Resins, Adhesives, Coatings." Department H, The Borden Chemical Co., New York, N. Y. 36 pages. This two-color product catalog and directory lists specifications, end-uses, and other technical data for the more than 1,000 products manufactured and distributed by the company. Industrial and consumer products are reviewed in the general areas of basic chemicals, monomers, polymers, resins, adhesives, coating materials, plastic products, fine chemicals, organic intermediates, and bio-chemical reagents. The directory is cross-indexed by product name and end-use.

Technical Books

"Hetrofoam 16-17." Preliminary Technical Bulletin No. 14. Hooker Chemical Corp., Niagara Falls, N. Y. 4 pages. This preliminary bulletin describes a new alkyd resin system (utilizing trichlorofluoromethane) as the foaming agent for the preparation of rigid fire-resistant polyurethane foams with a low K factor. The bulletin points out that the system permits processing in continuous mixing and metering machines or in batch mixing equipment and outlines the procedure followed in each method. Viscosity, specific gravity, density, water content, color, and clarity of the resin, Hetrofoam 16, and the semi-prepolymer, Hetrofoam 17, used in the system are given. Nine physical and chemical properties of Hetrofoam 16-17 cured foam are also listed.

"Why and Where It Pays You to Use Cable Insulated with General Electric Silicone Rubber." Bulletin CDS-208. Silicone products department, General Electric Co., Waterford, N. Y. 4 pages. This new illustrated bulletin lists the outstanding insulated properties of G-E Class 900 electrical-grade silicone rubber and discusses the major application areas in which silicone insulated cable has proved its performance. The added savings in installation costs are illustrated by a cost comparison between silicone insulated cable and varnished cambric cable. In addition, a comparison of properties vital to cable applications is presented among silicone rubber, butyl rubber, SBR, and natural rubber.

"Hydraulic Jet Cleaners for Plant and Tank Cleaning." Bulletin 442. Sellers Injector Corp., Philadelphia, Pa. 4 pages. This bulletin presents a complete round-up of the company's modern plant and tank cleaning equipment. It covers six models for heavy-duty cleaning of walls, floors, and process equipment. Also covered are three models for cleaning entire inside area of tank cars, tank trucks, ships' tanks, or stationary tanks. Two products other than the cleaning equipment—steam injectors for steam boilers and manual-operated positive shut-off valves for highly corrosive liquids and penetrative fluids—receive brief treatment.

"Compounding Natural Rubber for Heat Resistance." BRPRA Technical Bulletin No. 3. Natural Rubber Bureau, Washington, D. C. 24 pages. This new booklet details a number of compounds that now extend the usage of natural rubber to products intended for service at temperatures from 100-125° C. It provides the first description of a group of new heat-resistant compounds developed by the British Rubber Producers' Research Association. In selecting the compounding ingredients, the booklet points out that the choices of the cross-linking system, protective agents and filler(s) are determined by the properties of greatest importance in the service of the component to be made. Applications include conveyor belt covers, seals, gaskets, thread, and engine mountings.

"Atlas Hydraulic Presses." Catalog No. 88. Atlas Hydraulics Division, Delaware Valley Mfg. Co., Inc., Philadelphia, Pa. 14 pages. This new catolog illustrates and describes the company's new hydraulics presses for compression molding, transfer molding, and laminating. The bulletin covers 41 standard models now available for laboratory or production work. Specifications and details are included for Series 100, 125, 150, 200, 250, and 300 models.

"Scientific and Test Instruments Condensed Catalog." Catalog G-10. Minneapolis-Honeywell Regulator Co., Philadelphia, Pa. 48 pages. A brief description, typical illustration, salient specifications, and reference for additional information appear for each family of Honeywell instruments used in the field of scientific measurement, recording, and testing. The catalog includes D.C. amplifiers, data handling systems, laboratory and calibration instruments, magnetic tape instrumentation, nuclear instrumentation, oscillographs, recorders and indicators, servo components, temperature controllers, and transducers.

Technical Books

Publications of The British Rubber Producers' Research Association, Welwyn Garden City, Herts, England:

No. 290. **"The Reaction of Sulfur and Sulfur Compounds with Olefinic Substances.** Part XI. The Mechanism of Interaction of Sulfur with Mono-Olefins and 1:5-Dienes." By L. Bateman *et al.* 14 pages. A polar chain mechanism is advanced for the reaction of olefins with sulfur at about 140° C.; the initiation step is heterolysis of a polysulfide into polar persulphenyl intermediates, at variance with the current view that thermal dissociation of S-S bonds under these conditions occurs homolytically. A review of the literature indicates that, while such homolysis can be induced by other means, it does not occur simply on heating sulfur or organic di- and polysulfides at about 140° C.

No. 291. **"The Reactions of Amines and Sulfur with Olefins.** Part IV. The Chemical and Thermal Decompositions of NN'-Thiobisamines and Their Reactions with Olefins." By R. W. Saville. 9 pages. A novel method of olefinic sulfuration with the thiobisamines and hydrogen sulfide is described, and the effect of the thiobisamines on interaction of olefin and sulfur is examined. Mechanisms of the thermal decomposition and of the reactions are discussed.

No. 292. **"Some Reactions of 1:2-Epithio-Octane and an Exchange Reaction of Arensulphenyl Chlorides with Organic Disulfides."** By C. G. Moore and M. Porter. 5 pages. The first paper presents a study of the reactivity of the epithio-group in 1:2-epithio-octane toward heat and the nucleophilic reagents AlH_4^- and HS^-. In the second paper arensulphenyl chlorides have been shown to undergo an exchange reaction with aryl, aralkyl, and alkyl disulfides to give unsymmetrical disulfides.

"Perarylated Silanes: A Class of Stable Organic Molecules." L. Spialter and C. W. Harris. Wright Air Development Center, U. S. Air Force. Available from OTS, United States Department of Commerce, Washington 25, D. C. 22 pages. 75¢. Production of many new materials from perarylated silanes—the new organic system remarkable for its size, versatility, and radiation and heat stability—is predicted in this report recently released to industry. The perarylated silanes comprise a class of molecules which contain hundreds of thousands of members constructed by combining silicon atoms and aromatic groups into various molecular arrangements. Some types have shown unusually high resistance to radiation, oxidation, and high temperature (to 600° C.). Their versatility may lead to use in lubricants, hydraulic fluids, insulators, radiation-detection materials, elastomers and plastics, and new adhesives, and synthetic fibers.

"This Is Rubber Today." The Rubber Manufacturers Association, Inc., New York, N. Y. 22 pages. This report is about the people, products, and performance in a dynamic growth industry. The booklet sets out the basic facts and figures about the industry, tells how its workers fare, and touches briefly on the industry's great diversification. Numerous statistics are also included.

"Products of The Dow Chemical Co." The Dow Chemical Co., Midland, Mich. 42 pages. This new catalog for 1959-1960 lists the properties and uses of 375 industrial, pharmaceutical, and agricultural chemicals currently produced by Dow. Most of these chemicals are basic chemicals; a few are developmental items. A cross-reference index to these products enhances the value of this booklet.

"Absolute 3 Micron Triphane Filter Assembly for Ground Service Carts." Aircraft Porous Media, Inc., Glen Cove, N. Y. 6 pages.

"International Colour Research." Faber Birren & Co., New York, N. Y. 16 pages.

"Vibrolator Vibration Inducers." Martin Engineering Co., Neponset, Ill. 38 pages.

"Self-Dumping Steel Hoppers for Bulk Material Handling." Bulletin No. 265. Roura Iron Works, Inc., Detroit, Mich, 4 pages.

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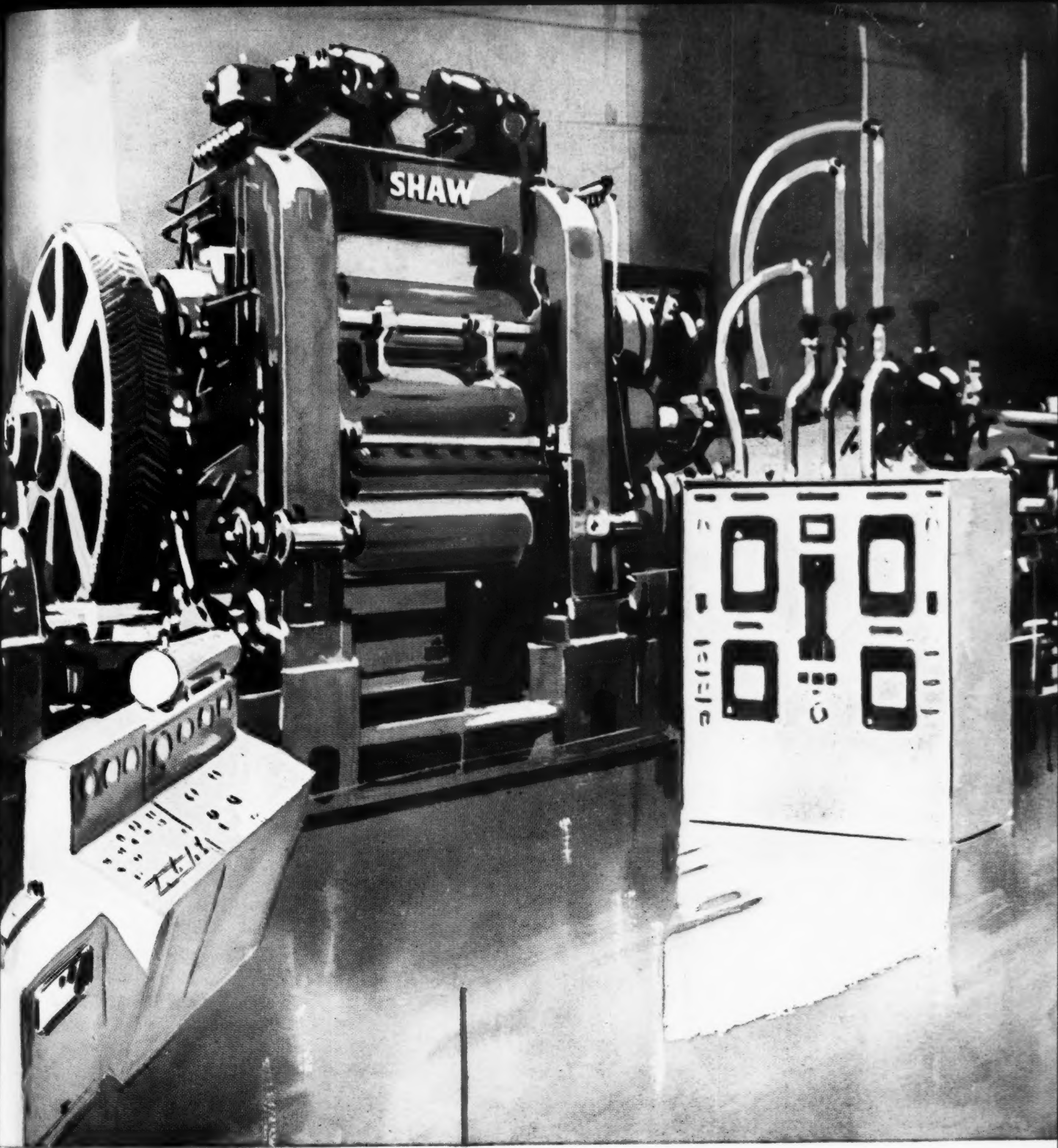
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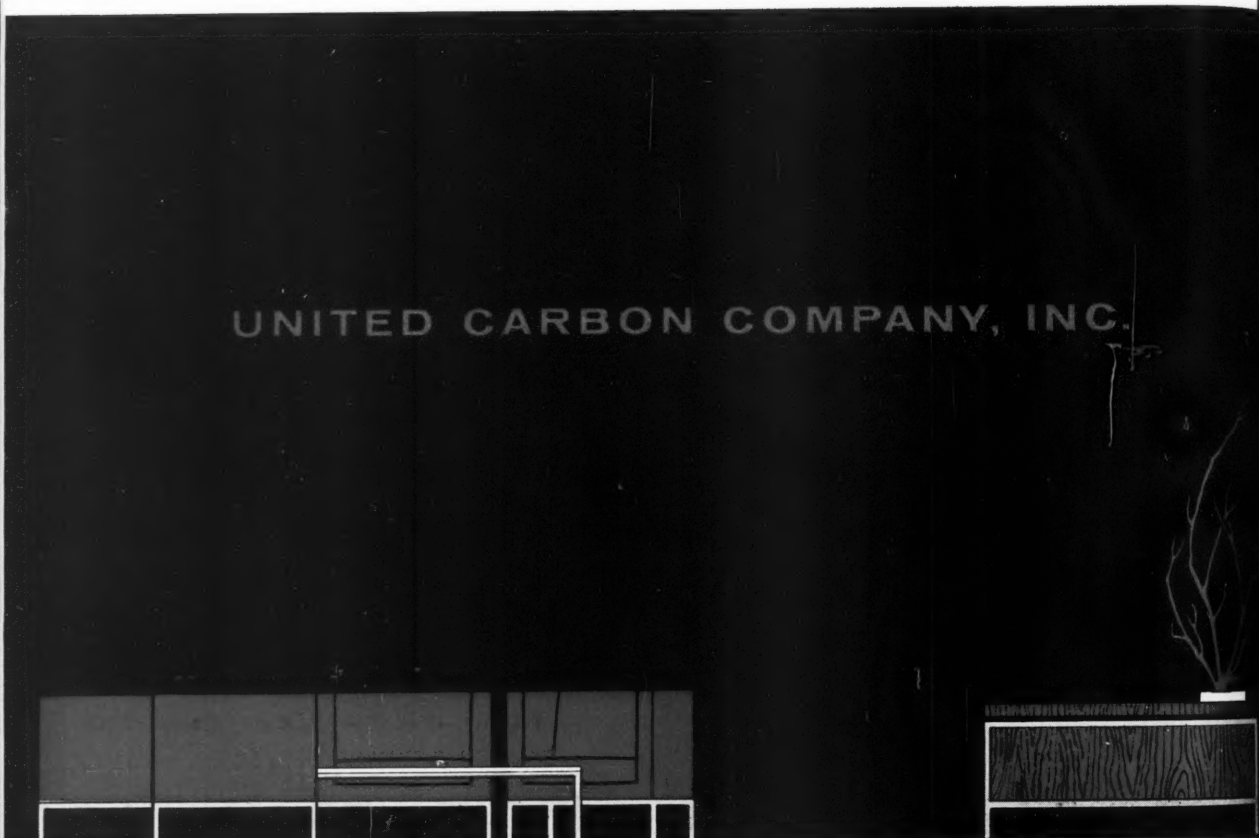
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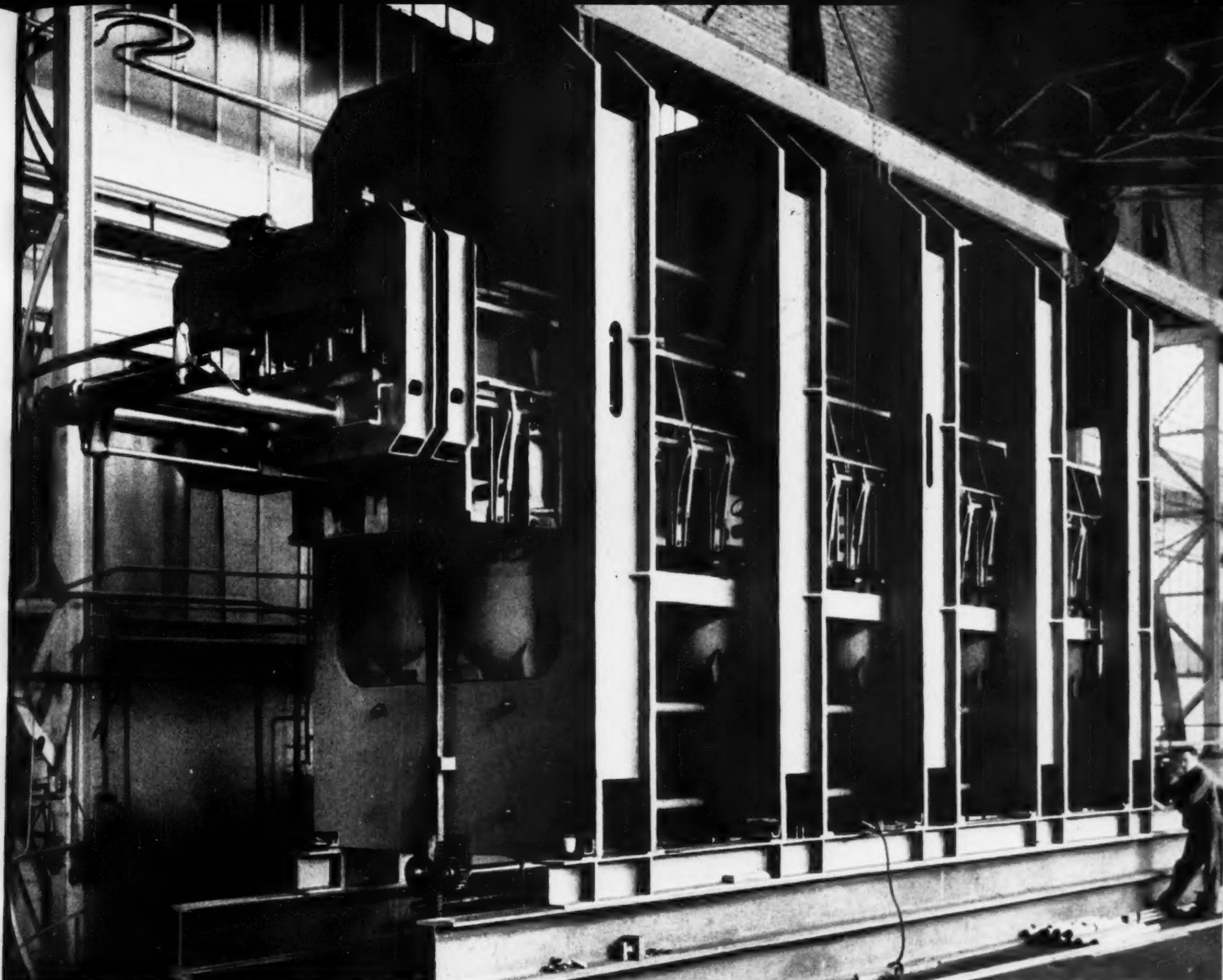
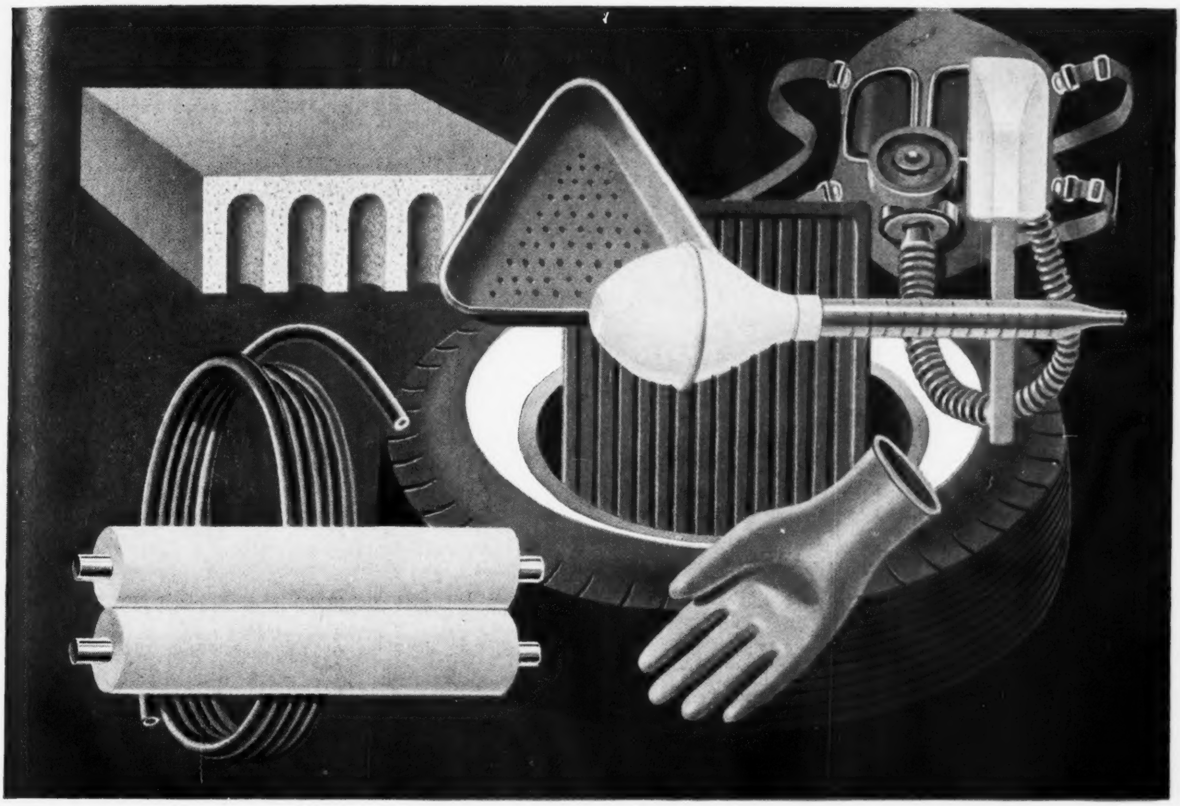
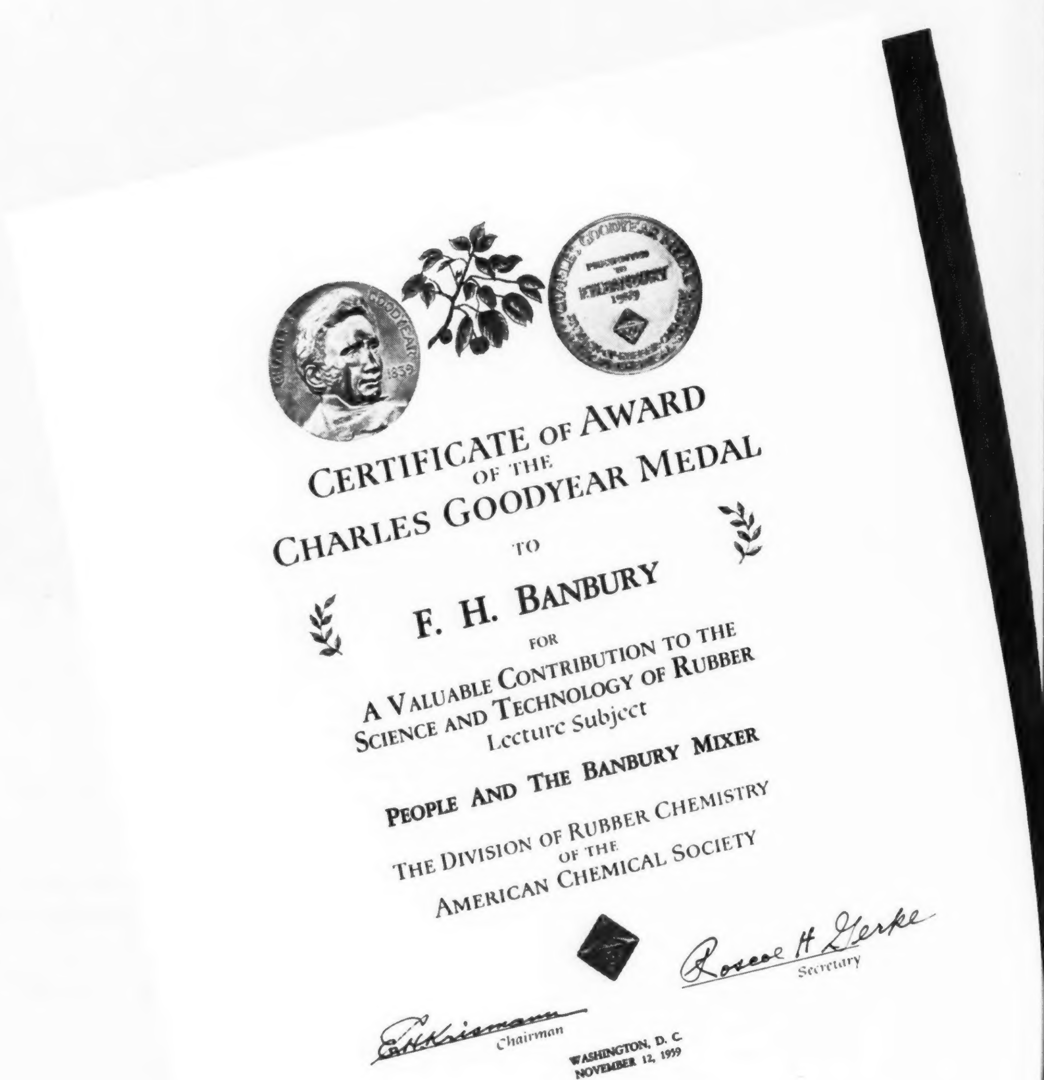


Gentro-Jet operator

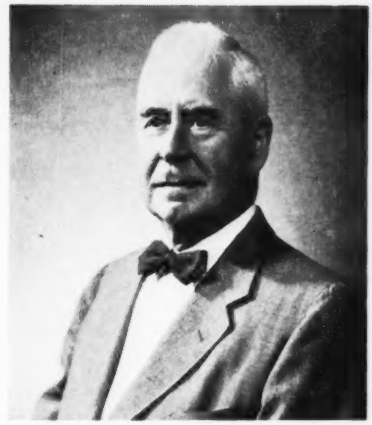
Free-black operator



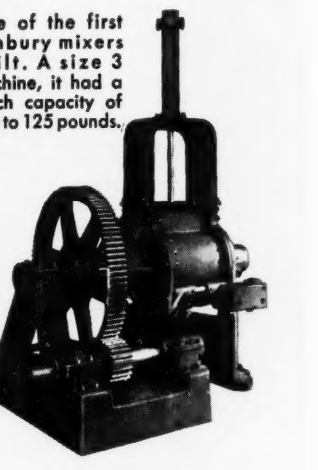
1959 Charles Goodyear medal awarded to



ed to Dr. Fernley H. Banbury



His invention, the Banbury® mixer, is still growing in importance after 43 years



One of the first Banbury mixers built. A size 3 machine, it had a batch capacity of 100 to 125 pounds.

The Charles Goodyear Medal – highest honor in rubber chemistry – is awarded annually by the American Chemical Society's Division of Rubber Chemistry. This year it was presented to Dr. Fernley H. Banbury on November 12th at the International Rubber Conference, Washington, D. C.

Dr. Banbury has contributed much to the mechanization of the rubber industry. Until 1916, when he joined Birmingham Iron Foundry with his patent for an internal mixer, plasticizing and mixing of rubber was always done in roll mills. After the introduction of the Banbury mixer, industry leaders discovered that they could vastly increase output while improving quality in mixing and compounding rubber stocks.

It is interesting to note that originally Banbury mixers were identified according to the number of mills they could displace. Thus, the size 3 Banbury shown above, which was built for Goodyear in 1916, could do the work of three 60" mills. The larger sizes–9, 11 and 27–were numbered according to the relation of their capacities to that of the size 3.

Today, acceptance of internal mixing has reached the point where there is scarcely a rubber or plastics plant in America that does not have one or more Banburys. And these machines are used extensively throughout the rest of the world.

During the Banbury mixer's history, Farrel-Birmingham has carried on a program of improvement in design and construction as well as in service dependability. Drive power has been steadily increased, efficiency of operation raised.

The company has developed the Banbury mixer for such modern processing techniques as high-pressure mixing for shorter cycles, the grinding and reclaiming of cured rubber stocks, and the dewatering of natural and synthetic rubber. Success in the rubber field has led to its use for the mixing of plastics, cellulose acetate, asphaltic materials, linoleum and other compounded products.

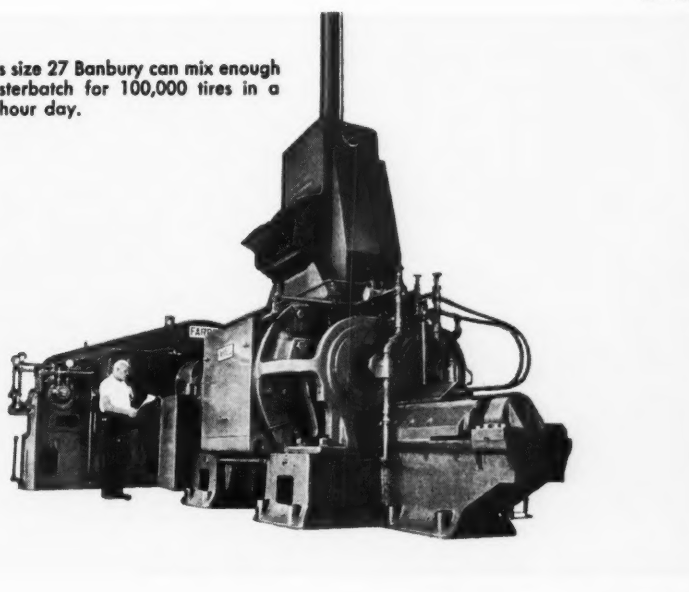
Dr. Banbury retired as active manager of the Banbury mixer department of Farrel-Birmingham Company in 1944, but continued his association with the company as a consultant. In all those years, Dr. Banbury never felt that his invention had fully satisfied all of its potentialities for new applications – and he still does not think so.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT

Plants: Ansonia and Derby, Conn., Buffalo and Rochester, N. Y.
Sales Offices: Ansonia, Buffalo, Akron, Chicago, Ann Arbor (Mich.), Los Angeles, Houston, Atlanta
European Sales Office: Piazza della Repubblica 32, Milano, Italy

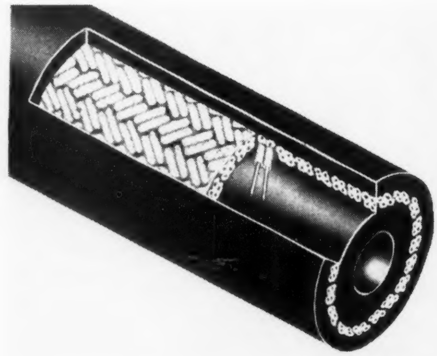
FARREL ®

FB-1183



This size 27 Banbury can mix enough masterbatch for 100,000 tires in a 24-hour day.

NEW PRODUCTS



R/M Homoflex pressing-iron hose

R/M Homoflex Pressing-Iron Hose

A burst-resistant hose for use on steam pressing irons in clothing manufacturing plants is now available from Raybestos-Manhattan, Inc., Passaic, N. J. Extremely flexible and light in weight, Homoflex pressing-iron hose is designed for a wide margin of safety and operator protection. Case histories demonstrate ease of handling and reduction of operator fatigue, according to the manufacturer.

This hose features a tube with high resistance to heat and charring; while the butyl cover withstands heat and oxidation and remains flexible despite long usage. The strength member, composed of long-fiber asbestos, is tightly twisted around a high tensile corrosion-resistant wire to make the hose burst resistant. Wire prevents open burst when worn out. The hose comes in sizes $\frac{3}{16}$- to $\frac{3}{8}$-inch and is recommended for use up to 100 pounds steam pressure.

Additional information is available from the company.

Candycote Carpet/Underlay

Candycote, a new concept in floor covering which can be used initially as carpeting and later as luxurious padding under conventional carpet, currently is being offered to homemakers by Crown Rubber Co., Fremont, O.

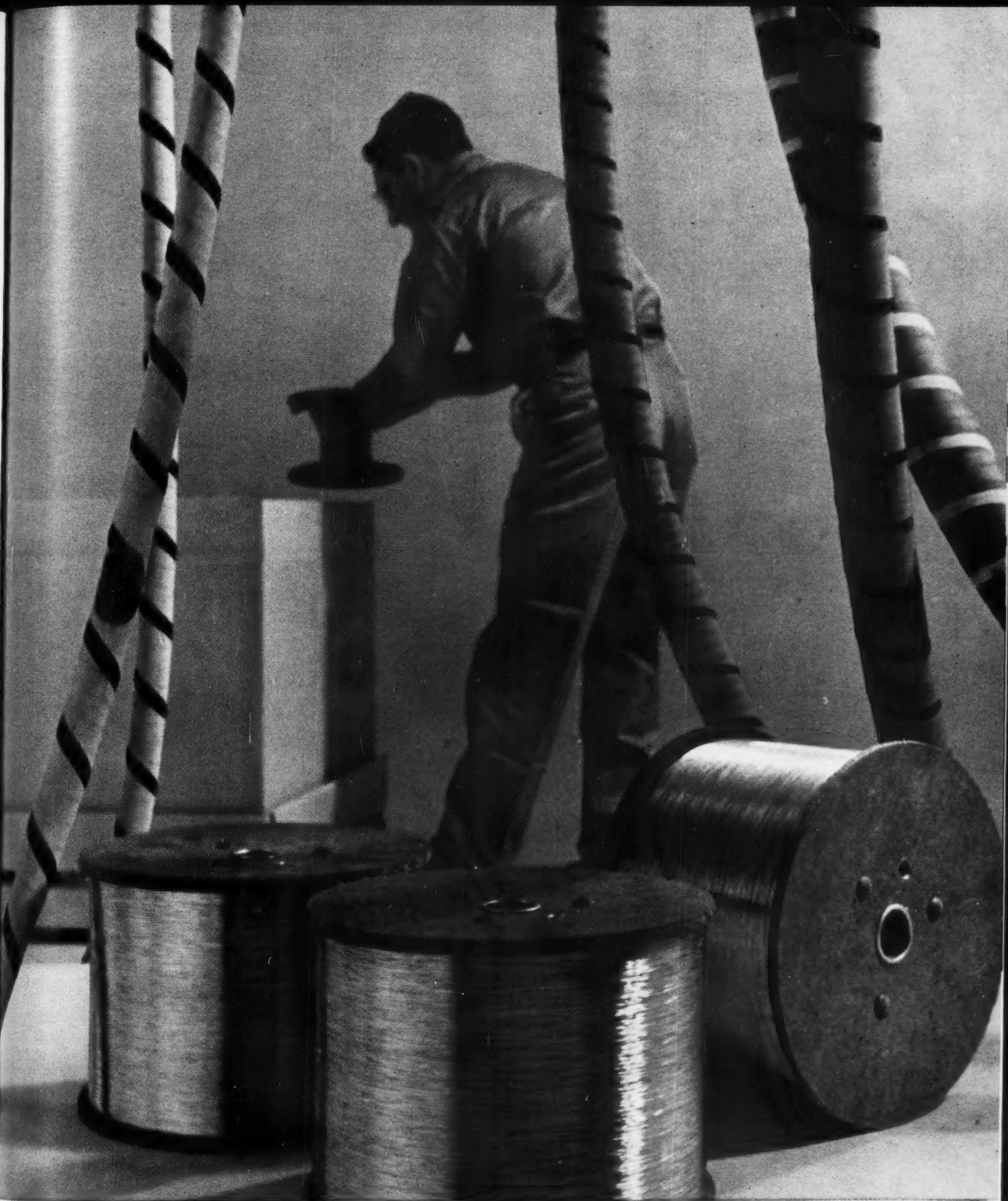
This new floor covering combines smart pinstripe or broadstripe fabric with a durable foam rubber backing made from Pliolite Latex 5352, a new synthetic latex produced by the chemical division, The Goodyear Tire & Rubber Co., Akron, O.

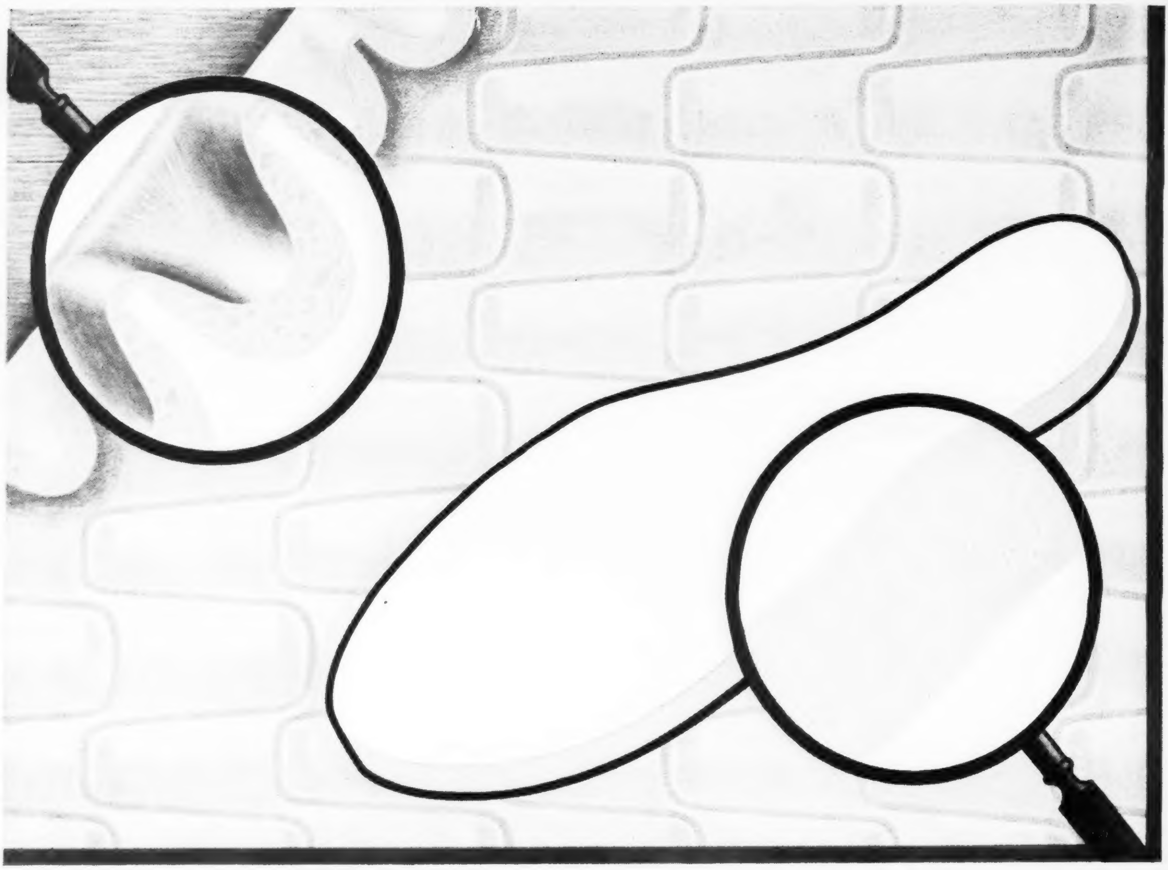
In addition to being a floor covering, either as carpeting or under-carpet padding, Candycote also is practical for use as carpet protectors, stair coverings, or hall runners. When used as a carpeting, Crown Rubber provides a written three-year guarantee on the material, and a liftetime guarantee when it is used as carpet underlay.

Candycote is made with a foam rubber backing $\frac{3}{16}$-inch in thickness. The cotton fabric patterns are available in 9- by 12-foot and 9- by 15-foot sizes, with either serged or unserged edges. For use in halls or on stairs, or for wall-to-wall installations, Candycote is available in rolls of 27-inch or 9-foot widths.

Crown Rubber also makes a foam rubber covering specifically

(*Continued on page 348*)



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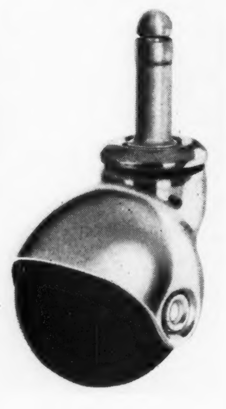
Merry Christmas
with all good Wishes for a
HAPPY NEW YEAR from
everyone at . . .
The C.P. Hall Co.
Call Hall and
keep your chemists
and compounders in
Christmas mood
all year long . . . with
the best in chemicals

New Products

(Continued from page 342)

for hallways or stairs. Called Foamstep, it also is based on a Goodyear Pliolite latex foam covered with durable, embossed vinyl. Bound edges give Foamstep a finished carpet appearance; yet the easy-to-clean surface makes it practical for use in commercial as well as residential installations.

New Faultless Ball-Type Caster



New "Royal-Roll" caster

A completely new caster, shaped like a ball, has been introduced by Faultless Caster Corp., Evansville, Ind. This spherical caster, known as the "Royal-Roll," was developed for use on office chairs, office furniture, and home furniture. It combines the double ball-bearing swivel construction long used in the best casters with a unique global styling.

The wheel of the new caster is a "Ruberex" ball, two inches in diameter. It is made of non-marking, stain-resistant rubber, with a hard core and a cushion tread.

The horn of the caster conforms to the spherical design of the wheel. It is made of formed and drawn steel, and is available in five standard finishes.

The "Royal-Roll" caster is made with a choice of three types of stems—for wood bases, tubular metal bases, and bright nickel.

Special Teflon Coated Conveyor Belt

Quaker Rubber Division, H. K. Porter Co., Inc., Philadelphia, Pa., is marketing a non-stick Teflon coated, glass-fabric conveyor belt to solve the problems of heat and sticky materials in industrial handling. Possessing a unique combination of electrical, chemical, and physical properties, the new belt incorporates the best qualities of Teflon and fiber-glass yarn to offer industry a conveyor belt for lightweight applications.

The chemical and solvent resistance, high and low temperature characteristics, and anti-adhesive, anti-friction properties of Teflon coated, glass-fabric belting suggest many diversified applications in the aircraft, chemical, food processing, packaging, paper, plastic, printing, textile, and other industries.

At present Quaker is offering Teflon coated glass-fabric endless single-ply belts in either 0.005- or 0.010-inch thickness, in widths up to 36 inches with a lap splice. This belt is said to have a safe working stress of five pounds per inch of width for 0.005-gage and ten pounds per inch of width for 0.010-gage. For additional information write to the company.

New Pirelli BS 3 Removable Tread Tire

An automobile tire, designated the BS 3, with a removable tread of three wire-reinforced rubber rings was recently introduced by Pirelli S.P.A., Milan, Italy. Pirelli officials claim that tests prove it is superior to conventional foreign-car tires in its shock resistance, traction, noise level, and ease of steering.

The surface of the tire carcass is smooth except for two ridges around the circumference that serve as tracks to keep the three tread rings in position. The rings are stretched on the tire carcass while it is deflated. They are smaller in diameter

(Continued on page 350)

New Products

(Continued from page 348)

Tread being installed on Pirelli BS 3 tire

than the inflated tire; when the tire is inflated, they fit tightly and are secured. Because a flat might be more dangerous than usual if it deflated the tire sufficiently to loosen the rings, the new tire is equipped with a special valve that Pirelli says controls deflation, making operation safe.

Rings with different tread patterns are interchangeable. By switching to the appropriate pattern, a driver can use the same tire for all road and seasonal conditions. Tungsten carbide studs can be fitted to winter treads to increase safety on snow and ice without slowing down a car on a clear road, as the conventional chains now being used do.

Since the tread is usually the first part that wears out, Pirelli sees an economic advantage in being able to replace it simply. It is cheaper to buy one tire with warm-weather and winter treads than to buy two tires. The tread rings will be more expensive than a retread job; however, Pirelli claims they are superior to retreads.

The construction of carcass and treads is responsible for the tire's better performance, according to Pirelli. This tire is more shock resistant, for instance, because only the part of the tread ring that hits an obstacle is affected by the shock. In one-piece tires the shock is transmitted throughout the tread and carcass. Performance is improved also by the fact that the tread blocks are fixed to the unstretchable metal wires in the tread. The carcass of the tires used in the demonstration was constructed from rayon tire cord.

Pirelli is now producing the new tires in Europe to fit foreign cars. These will be available in the United States in a few months at prices comparable to those of other premium tires. Sizes for American cars are in the development stages. Pirelli expects the new tire to increase its share of the United States market significantly.

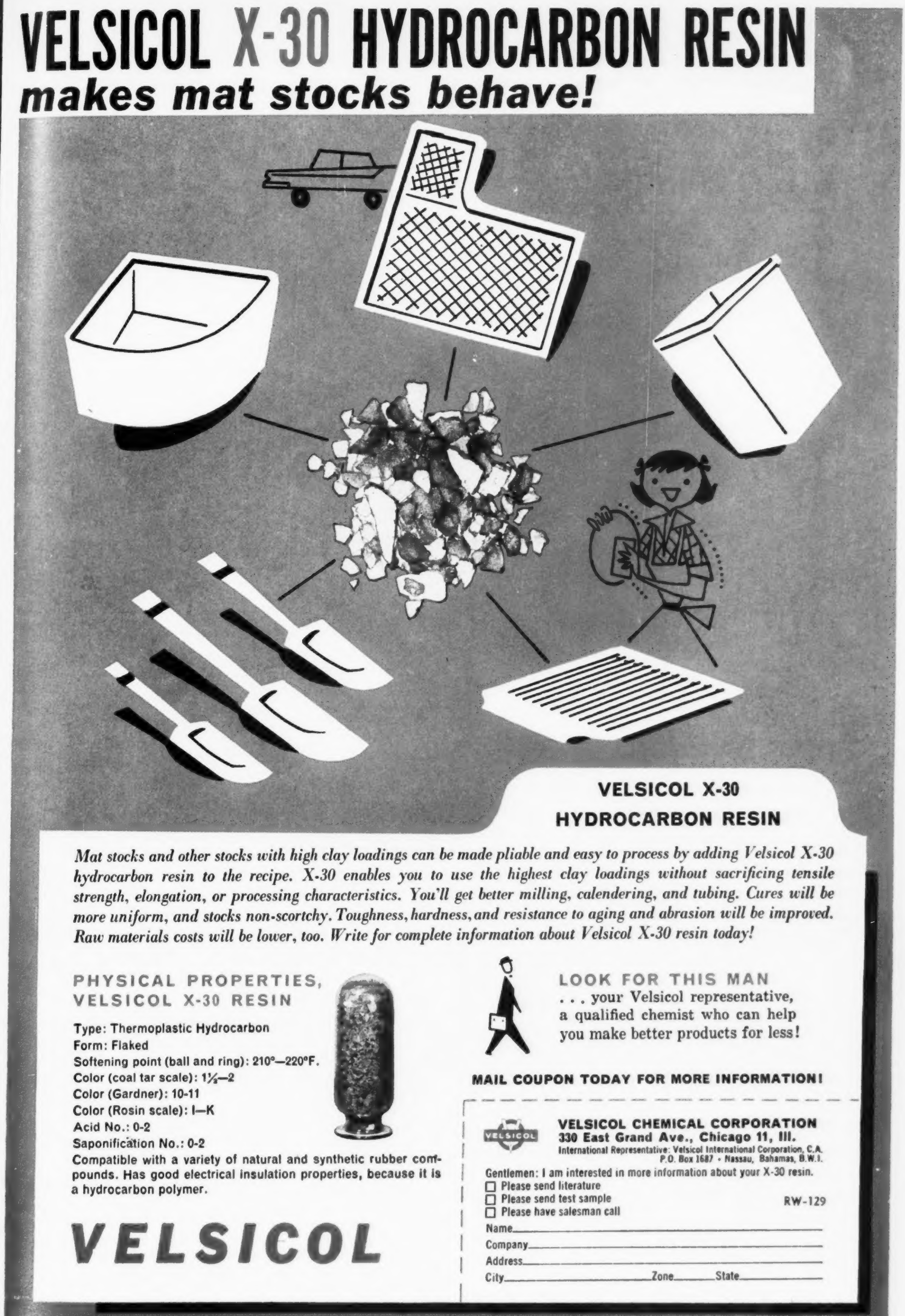
New Wil-Gard Poly-D Gloves

Addition of a new line of Wil-Gard Poly-D (polyethylene disposable) gloves is announced by The Wilson Rubber Co., industrial division, Canton, O., a division of Becton, Dickinson & Co.

New Wil-Gard clear polyethylene, five-fingered disposable gloves offer hand protection, can be worn on either hand, are prepowdered with Bio-Sorb, and are easy to slip on or off.

Lightweight, flexible, and moisture-proof, the gloves protect hands from numerous chemicals, powders, and resins. They also

(Continued on page 354)


VELSICOL X-30 HYDROCARBON RESIN
makes mat stocks behave!
VELSICOL X-30
HYDROCARBON RESIN
Mat stocks and other stocks with high clay loadings can be made pliable and easy to process by adding Velsicol X-30 hydrocarbon resin to the recipe. X-30 enables you to use the highest clay loadings without sacrificing tensile strength, elongation, or processing characteristics. You'll get better milling, calendering, and tubing. Cures will be more uniform, and stocks non-scortchy. Toughness, hardness, and resistance to aging and abrasion will be improved. Raw materials costs will be lower, too. Write for complete information about Velsicol X-30 resin today!
PHYSICAL PROPERTIES, VELSICOL X-30 RESIN
Type: Thermoplastic Hydrocarbon
Form: Flaked
Softening point (ball and ring): 210°—220°F.
Color (coal tar scale): 1½—2
Color (Gardner): 10-11
Color (Rosin scale): I—K
Acid No.: 0-2
Saponification No.: 0-2
Compatible with a variety of natural and synthetic rubber compounds. Has good electrical insulation properties, because it is a hydrocarbon polymer.
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International Representative: Velsicol International Corporation, C.A. P.O. Box 1687 • Nassau, Bahamas, B.W.I.
Gentlemen: I am interested in more information about your X-30 resin.
☐ Please send literature
☐ Please send test sample
☐ Please have salesman call
RW-129
Name
Company
Address
City Zone State

New Products

(*Continued from page 350*)

protect precision parts from perspiration corrosion and keep foods free from hand contamination.

Poly-D gloves feature strong, heat-welded seams with smooth edges that provide excellent resistance to snagging and tearing without sacrificing manual dexterity and touch-sensitivity.

Available in medium and heavy weights, Poly-D gloves are packed 144 to a box with paper spacers, in small, medium, or large sizes.

Fiberthin 71514T-Truck Tarpaulin

A new truck tarpaulin material, built to take three times the punishment of comparable tarps on the market, has been developed by the United States Rubber Co., New York, N. Y. The new material, a neoprene-coated nylon, has been made part of the firm's Fiberthin line. It was developed after studies of average truck tarp performance showed the need of stronger constructions for heavy service.

The new construction, designated Fiberthin 71514T-Truck, is said to offer 300% more abrasion resistance than other current neoprene materials, and greatly improved bond of the coating to the nylon. The adhesion is rated by the company at 40 pounds per square inch and is unaffected by moisture, resulting in a tarp with superior wind-whip resistance.

The new material, made at the company's Woonsocket, R. I., plant, is similar in appearance to regular Fiberthin tarp materials, but it has a smoother and harder surface. U. S. Rubber does not sell finished tarps, but supplies the Fiberthin material to fabricators.

New Armstrong Armaflex Insulation

Armstrong Cork Co., Lancaster, Pa., is now offering a flexible, foamed plastic insulation material, designated Armaflex, which has been used sucessfully to insulate chilled water pipes and also to prevent condensation. Armaflex, which has a built-in vapor barrier, has a closed cellular structure which provides high thermal efficiency and prevents warm, humid air from coming into contact with cold pipes.

The insulating material was used recently to eliminate the problem of condensation in a plant of The Firestone Tire & Rubber Co., Akron, O. Chilled water lines leading from a refrigeration unit to the general offices were run through a rubber processing area of Plant #1 where high humidity conditions existed. Armaflex eliminated the problem of condensation and insulated the pipes with a durable covering.

Armaflex, in addition to being an efficient insulating material, also is easy to work with. The pipe covering comes in tube and sheet form. The tubular forms can be slipped over the pipes or slit, snapped over the pipe, and sealed with a waterproof adhesive. The flexibility of Armaflex allows it to be bent around curved joints.

The material does not rot or deteriorate, with the result that it provides a long-lasting job, according to Armstrong. To date, moisture condensation has been no problem in the area of the Firestone plant, it was reported.

New Publications

(*Continued from page 328*)

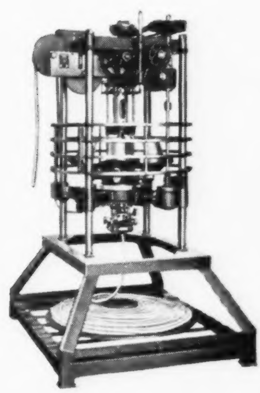
"Electrically Controlled Magnetic Solenoid Valves." Magnatrol Valve Co., Hawthorne, N. J.

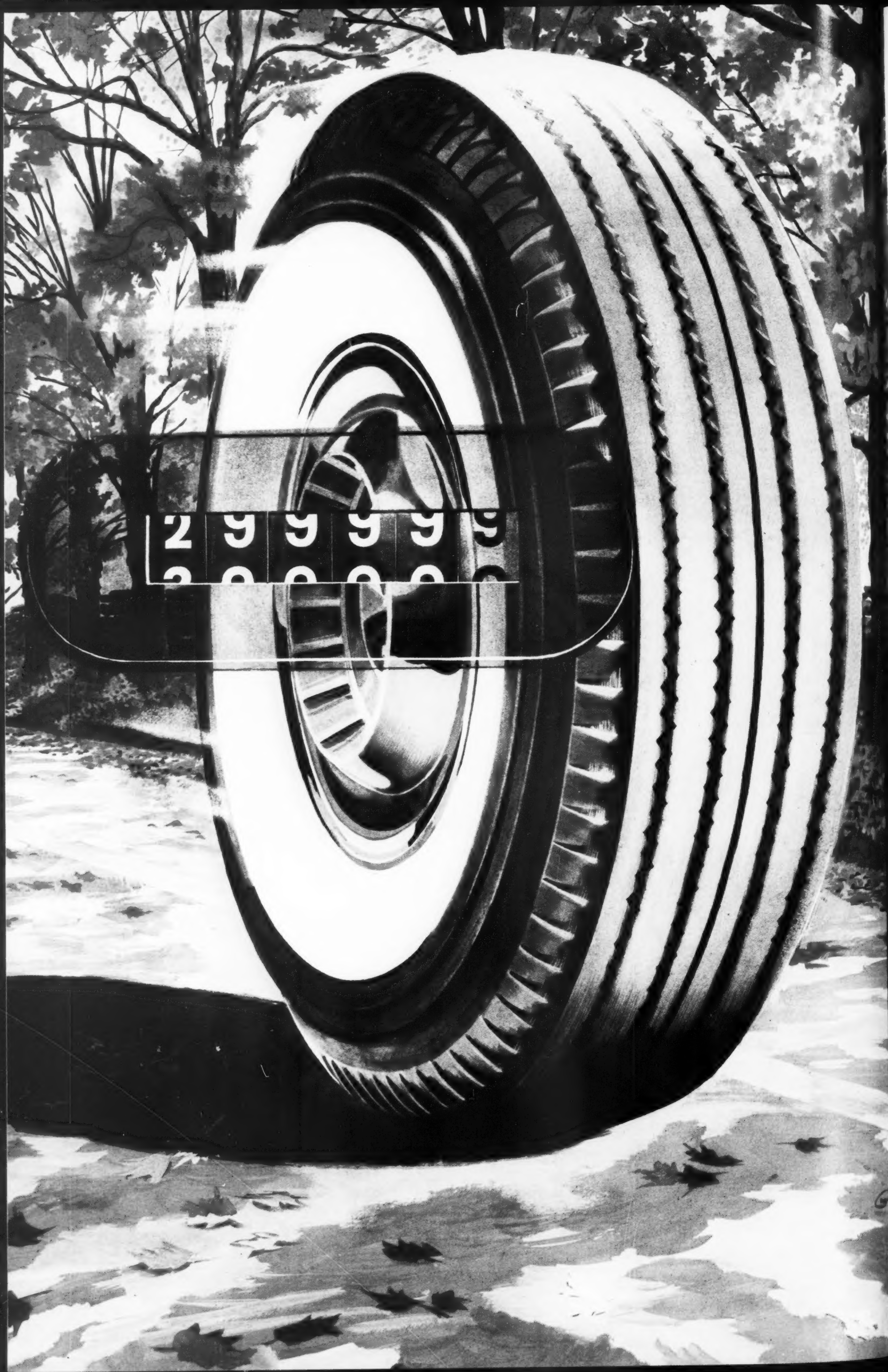
"Mass & Paste Mixers; Ribbon Mixers." Catalog "D." Paul O. Abbé, Inc., Little Falls, N. J. 12 pages.

"Basic Guide to Ferrous Metallurgy." Tempil Corp., New York, N. Y. 2 pages.

"Multipress." Bulletin 195-B. Denison Engineering Division, American Brake Shoe Co., Columbus, O. 4 pages.


• Maximum Hose Strength and Flexibility
• Minimum Hose Expansion under High Pressure

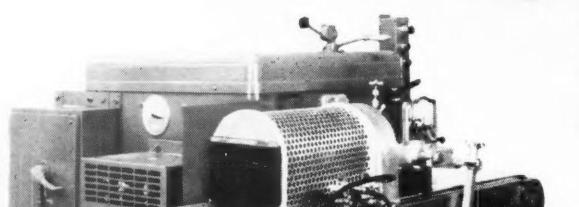



299999

Typical rubber part molded from preps cut automatically by Wink Cutter at Monarch Rubber Co., Hartsville, Ohio.

"Wink Cutter saves us 50 manhours a day."...Monarch Rubber Company

automates cutting of mold preps; eliminates double handling; speeds operations



Model M-420 Universal is a completely automatic machine for both continuous and intermittent cutting. Pays off on short or big runs. The built-in metering conveyor elements transport the uncut stock to the knives, precisely measure the length of cut and move the cut stock away from the blades. Wink actually measures while it cuts from four points simultaneously. It does not depend upon timing or synchronization with another unit or machine—does not cut against a dead element but against another live knife.

New—Large cutter handles up to 6-inch diameters. Write for information.

"The Wink Cutter has really paid off for us in cutting mold preps", reports Monarch Rubber Company, producers of a wide range of molded rubber products. "By automatically cutting mold preps right at the extruder, at rates up to 1500 pieces a minute, we're saving 50 manhours a day." In this operation, the extruded material was formerly cut into long strips, transported to a guillotine cutter, unloaded, and cut at much slower rates.

Accuracy of the Wink Cutter also saves money for Monarch. The Wink unit cuts each piece within a fraction of an ounce. By holding weight of each piece so closely, flashing in the mold is reduced, minimizing waste material. "It's the most accurate machine we've run across", reports Monarch, "and this is important in big production runs."

Wink Cutters *can help you* reduce costs in cutting rubber, both raw and cured, plastics, impregnated fabrics, reinforced hose, natural and synthetic fibers, ceramics, candy ... even sticky or viscous materials. Write today for Bulletin W-100... it lists complete engineering information. Contact Motch & Merryweather Machinery Company, Wink Cutter Division, 1250 East 222nd Street, Cleveland 17, Ohio.

MOTCH AND MERRYWEATHER

WINK CUTTER DIVISION
1250 East 222nd Street • Cleveland 17, Ohio
Represented in United Kingdom, Eire, Europe by
FRANCIS SHAW & COMPANY LTD. • MANCHESTER 11, ENGLAND

NEW MATERIALS

New Silastic LS-63U Rubber

Silastic LS-63U, an extrusion and calendering grade of fluorocarbon silicone rubber, resistant to fuels, oils, and solvents, was recently introduced by Dow Corning Corp., Midland, Mich. This Silastic has been especially developed to provide three main benefits. First, it handles and processes easily—mills, calenders, extrudes, and molds like regular silicone rubbers. Second, it blends readily with other Silastic brand stocks—blends have intermediate solvent resistance. Third, it can be colored to any desired shade.

Some tentative specifications of Silastic LS-63U are reported as follows (as vulcanized with 1.6 parts of 2,4-dichlorobenzoyl peroxide, by weight; molding conditions: 5 minutes at 240° F.; oven cured, 8 hours at 392° F.)

Color	off white
Specific gravity	1.46 ± .03
Hardness, Shore A	60 ± 5
Tensile strength, psi	800
Elongation, %	150
% volume change after 24 hrs. immersion in ASTM Reference Fuel B at 77° F.	less than 25

Silastic LS-63U can be vulcanized with several organic peroxides, including 2,4-dichlorobenzoyl peroxide, benzoyl peroxide, and ditertiary butyl peroxide.

Because it is easily processed, design engineers will now be able to procure a wider variety of finished parts than heretofore available in fluorosilicone rubber. The primary uses for Silastic LS-63U are expected to be in the missile and aircraft industry where flexible seals and gaskets are required to withstand fuels and oils that normally swell and deteriorate other elastomers, causing them to fail in service.

More detailed information on this new Silastic rubber is outlined in Silastic Facts data sheet, 9-394, which is available from the company. Silastic LS-63U is regularly supplied without vulcanizing agent. Dow Corning will also ship Silastic LS-63 catalyzed with 2,4-dichlorobenzoyl peroxide.

New Mold-Ease Concentrate PCR

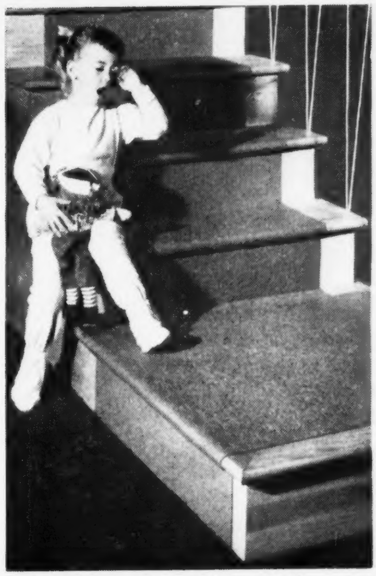
A new water-soluble mold lubricant, designated Mold-Ease Concentrate PCR, which assures quick release of molded plastic, ceramic, and rubber articles, has been announced by Merix Chemical Co., Chicago, Ill. Added production facilities finally permit the release of this water-miscible cast and mold releasing agent, developed in years of tests, reports the company.

The new material shows these characteristics: When it is sprayed or wiped on to casts or molds, quick release is assured when the mold is opened or item ejected. The life of dies, casts, or molds is prolonged considerably not only because of smoother lubrication but—as in high-temperature molding—because there is hardly any carbonaceous residue since Mold-Ease burns up nearly 100%. The new material is free of any silicones. Unlike oily lubricants, there is no oil-spotting, and finish of molded products becomes attractive and greatly enhanced, and degreasing operations are eliminated.

Aside from prime use in the plastics field, Merix Mold-Ease is used in ceramics as internal and external lubricant and perfectly adhering color-binder as well as on natural and synthetic rubber and with those metals where a non-oily and/or water-washable lubricant is desired.

(*Continued on page 364*)

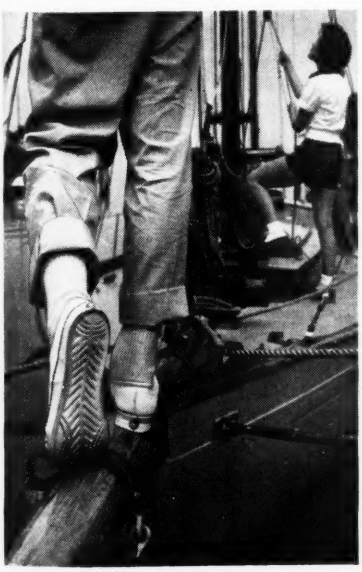
Rainwear—colors stay bright



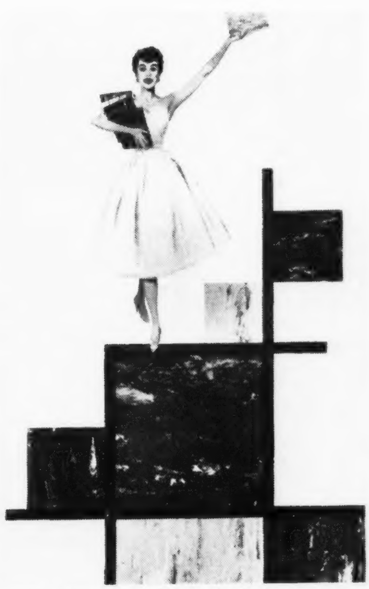
Stair treads—cost less with Ameripol

Erasers—mistakes come clean

More and more successful products are being made of **Ameripol Rubber**...the broadest line, from the world's largest source of synthetic rubber...**Goodrich-Gulf**



Shoe soles—easier processing



Floor tile—real comfort underfoot

Car rugs—Ameripol cut costs again

Goodrich-Gulf Chemicals, Inc.

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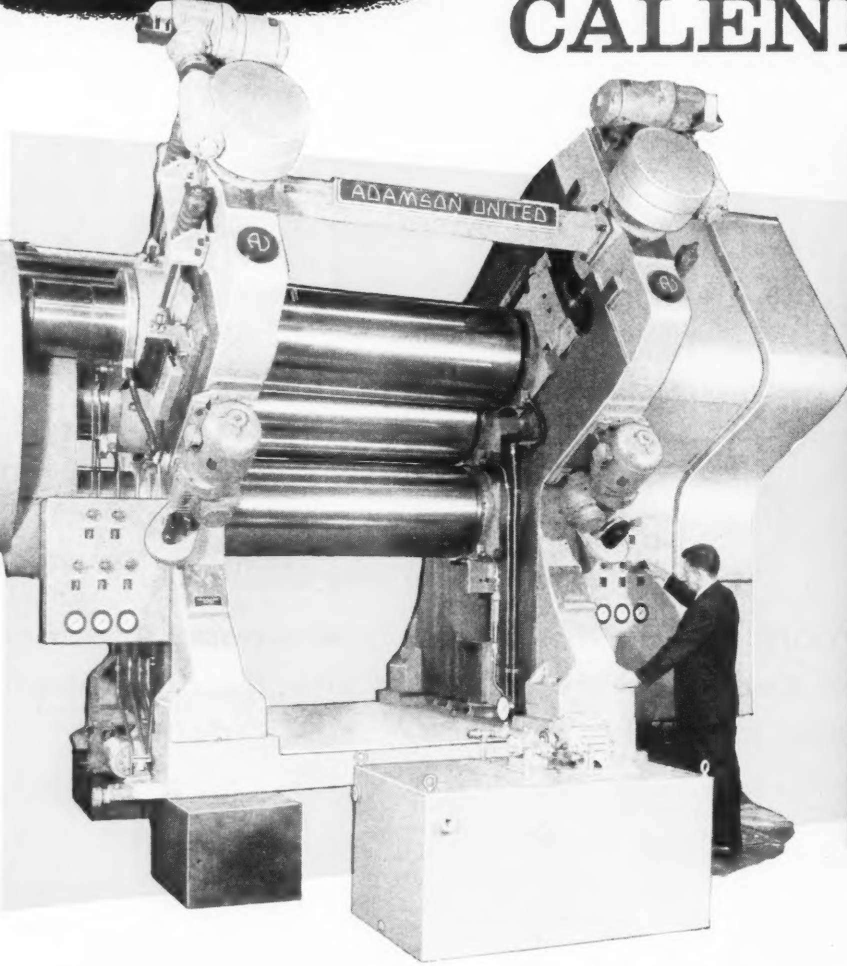
ADAMSON UNITED

PRECISION CALENDERS



Whether the project calls for supplying all mills, calenders, presses and associated machinery for a completely new and modern rubber or plastics plant, or a single unit for a new process, you'll find Adamson United equipment offers the most efficient design and up-to-date operating features for today's production requirements. Our full line of modern rubber and plastics calendering equipment is an outstanding example.

Adamson calenders are skillfully engineered for production of close tolerance, high quality material at high speed. Standard sizes range from 8" x 16" laboratory models to large production units with rolls measuring 36" x 92". Various types include 2, 3 and 4 rolls; vertical, 120 degree, inverted-L, Z-type, cascade, inclined and others. The unit illustrated is a 3-roll, 120-degree, connecting gear-type calender equipped with roll crossing. Adamson calenders are also available with such precision operating features as roll bending, zero clearance, flood lubrication, drilled rolls, anti-friction bearings and pinion-stand drive.

With a complete line of accessory equipment for continuous processing, Adamson United is prepared to handle any rubber or plastics calendering problem you may have. Our engineering staff is at your service — to recommend the unit best suited to your needs, or to develop special equipment to meet your specific requirements. Write or call for complete details — without obligation.

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7076

DESIGNERS AND BUILDERS OF BASIC MACHINERY FOR THE RUBBER, PLASTICS AND PLYWOOD INDUSTRIES

New Materials

(Continued from page 360)

One part of Mold-Ease to 10 parts water is the usual concentration for molding plastics; 1:7 is the diluting ratio for use on rubber molded items and from 1:6 to 1:4 for releasing ceramics.

A product bulletin-price listing is available from the manufacturer.

New Auxiliary Agent-Activator "R" Aids in Utilizing Silica Fillers

Henley & Co., Inc., New York, N. Y., has introduced a new Auxiliary Agent-Activator "R" for use in compounds incorporating silica fillers. When silica fillers are used, some difficulties arise as the filler cannot easily be incorporated, and the compounds incline to tighten and scorch. Auxiliary Agent-Activator "R" considerably reduces the deformation hardness of the raw mixes, without having any influence on the Shore hardness of the final product, and also prolongs the Mooney/scorch line, it is claimed. Even susceptible compounds can be processed without danger of scorching, reports Henley.

The speed of vulcanization is not changed by the addition of Activator "R." The vulcanizate, however, is influenced favorably by the dispersing effect of the new material. Transparent compounds do not lose their transparency. Additions of 8-12%, calculated on the contents of filler, have shown excellent results, the manufacturer further claims.

Further information, samples, and price schedule are available from Henley upon request.

Castor Oil Derivatives Produce Easily Handled Urethane Foams

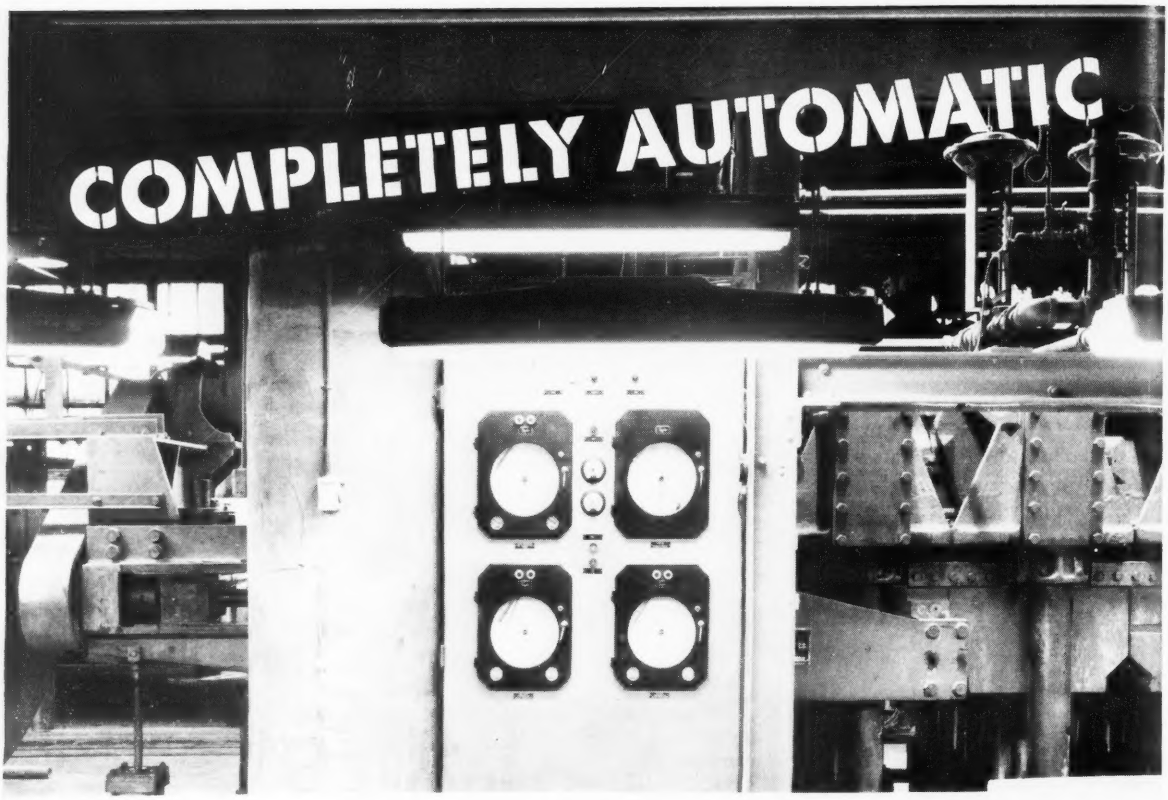
Based on especially modified castor oil derivatives, new low-cost urethane resin systems which have been developed by the Baker Castor Oil Co., Bayonne, N. J., provide an easier-to-handle, more economical method of foaming-in-place rigid and semi-rigid urethane foams for thermal and acoustical insulation, packaging, core construction, and similar applications. Heretofore urethane foam preparations based on prepolymers required the use of costly heavy-duty proportioning pumps and frequently heating equipment to combine properly a very viscous prepolymer with a very low viscosity catalyst.

The urethane resin systems which are employed in the Baker method are said to reduce the cost of foam preparation by avoiding the manufacture of prepolymer, substituting, instead, components of almost equally low viscosity that can be easily foamed from a newly available compact lightweight dual-headed spray gun employing air pressure. Utilizing the new type of spraying equipment eliminates the need of proportioning pumps, thus reducing equipment cost to 20% of previous methods, according to Baker.

With the Baker urethane formulations, low-density foams (1.5-2 lbs./cu.ft.) exhibiting no after-shrinkage can be sprayed without sagging on vertical surfaces in any thickness that may be desired. Decorative effects similar to stucco can be achieved when the foam is sprayed in thin layers. The simplicity of the method makes it ideal for applying foam as insulation on or between walls, tank or pipe exteriors, as void filler in packaging and aircraft, boat and automotive construction, and as protective coating for electrical equipment.

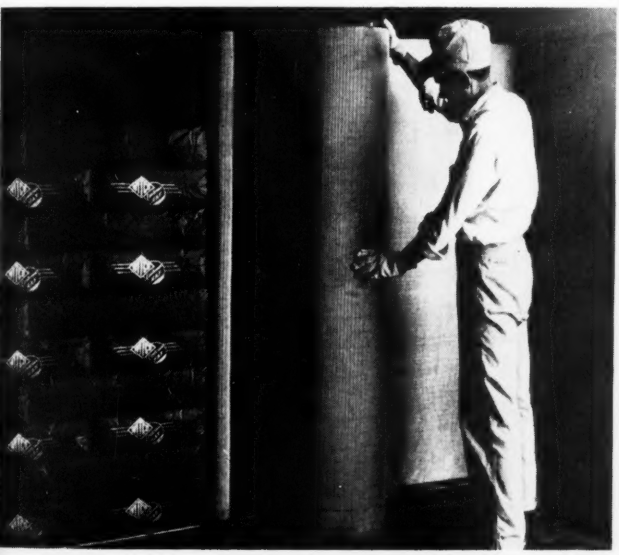
Additional claimed advantages of the castor polyol-based urethane foams over those from other urethane systems, suggested or in use, include far superior self-bonding properties, greater fire resistance, no crumbling or shattering under load, and an ability to regain shape on stress removal.

More detailed information on the Baker formulations, castor polyols, and method is available from the market development department, Baker Castor Oil Co.


COMPLETELY AUTOMATIC

When carbon blacks leave Witco-Continental plants, you can be sure they're in good condition. We photograph each shipment after loading as a check on correct and damage-free stacking. These photographs, with specially designed loading diagrams attached, are then sent to you as *your* check on shipping conditions.

WITH CARE BY WITCO-CONTINENTAL



Special car liners prevent interlocking of bags and protect them from each other and from the sides of cars or trailers. Convenient disposable pallets facilitate handling, yet eliminate storage or return costs.

If you prefer shipment by hopper car, Witco-Continental traffic control system means that you can get same-day information on the whereabouts of your shipment from your *local* sales office. There are 113 carefully maintained hopper cars ready to serve you.

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Fine-Particle Water-Fractionated Clays Reinforce Synthetic Polymers

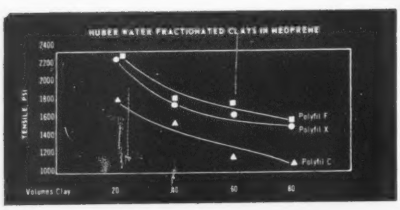
POLYFIL C

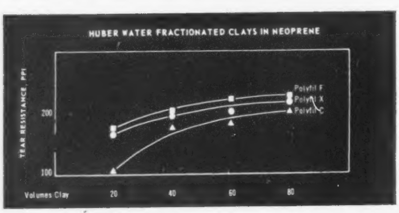
POLYFIL X

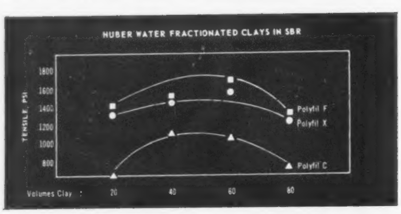
also available in spray-dried form as Polyfil XB

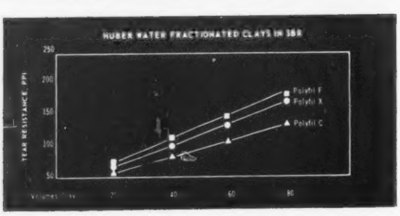
POLYFIL F

also available in spray-dried form as Polyfil FB









Huber's clay production methods have resulted in greatly improved grades of clay. The fine-particle water-fractionated clays are excellent for reinforcement where light, bright colors are needed. Known as Polyfils C, X and F (and as Polyfils XB and FB in spray-dried form), they may be the answer to your *light color pigmentation problems.*

A twelve-page Technical Service Bulletin is available. Ask for Bulletin R-614.

HUBER

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CARBON BLACKS • CLAYS • RUBBER CHEMICALS

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RUBBER WORLD
EDITORIAL

The Promise and Problems of the Sixties!

MANY statements have been made about the growth possibilities for the rubber industry during the 1960's. The presentation of a part of one of the most recent of these statements seems particularly appropriate at this time along with some of our own comments on a few of the problems to be faced in the years ahead.

George R. Vila, group executive vice president, United States Rubber Co., in a talk before the annual meeting of the Rubber Manufacturers Association in New York on November 20, pointed out that the rubber industry is in the midst of a technological evolution from which it should emerge with new dimensions, increased vigor, and broader horizons. Mr. Vila based his statement on the belief that the key to expansion for the rubber industry lies in the relatively new field of polymer chemistry. One road of polymer chemistry has led the rubber industry to neoprene, and nitrile rubbers, SBR, and the new synthetic polyisoprene and polybutadiene "stereo-regular" polymers. A second road has led to phenolics, polystyrene, vinyl, and many other plastics.

These two roads are now beginning to converge and are carrying the rubber industry into an area of new growth and diversification. It was suggested that within the foreseeable future the rubber industry will evolve into a polymeric complex in which the hazy line separating plastics from rubbers will be completely erased.

Product manufacturers will and should use the polymeric material that will provide the properties required for the lowest cost. At present they are having some problems, however, because of the long-established use of the terms "rubbers" and "plastics" that will have to be solved because of difficulties in domestic and international commerce. These problems involve shipping rates in this country and import duties set by various countries abroad that are different for products made from either of these two materials.

Of greater importance in the coming decade, however, is the problem of limiting or halting the general wage increases that have been granted in this country almost every year since the end of World War II. We cannot continue the price increases that follow these wage increases and compete effectively in the domestic market with lower priced imports from abroad; nor can we compete in world markets with products made in countries where labor costs are so much lower than our own. Such a change in wage policy cannot be made overnight, and the costs to industry, the workers, and the public will be high when a stalemate between management and labor results as in the case of the present steel strike. It is unlikely that there is an easy solution to this problem, but a solution there must be.

A related problem is the tariff reductions planned by our government in order to increase world trade which should be increasingly selective or delayed until domestic producers can achieve increased productivity and more competitive costs for various products.

The coming decade of the 1960's holds much in the way of promise, but also in problems.

R. G. Seaman
EDITOR

RUBBER WORLD

Direct Molded Footwear—I

Machinery and Equipment

By W. E. KAVENAGH
J. M. Huber Corp., New York, N. Y.

SINCE shortly after the discovery of vulcanization by Charles Goodyear, the term vulcanized footwear has been identified with light waterproof rubber footwear, heavy rubber boots for industrial use, and footwear with canvas or cloth top uppers, such as tennis shoes, basketball shoes, and casuals. The processing and manufacturing procedure is essentially the same for all of these types. The component parts are assembled on a last in the making room and then vulcanized in an autoclave or pressure heater.

New Process Developed

In 1940, Wellco Shoe Corp., Waynesville, N. C., introduced a new method of shoemaking in the United States. This new method involved the molding and vulcanizing of a sponge rubber sole and heel directly to the shoe upper, even those of leather. The direct molding of solid rubber bottoms to the shoe upper, using this same new method, was introduced here in the early 1950's.

The products resulting from the direct molding and vulcanizing of rubber bottoms to shoe uppers have also been called vulcanized footwear. In order to differentiate between the older autoclave method and the newer molding method the latter will be referred to as the direct molding of rubber footwear and the products as direct molded footwear.

The development of the process for the direct molding of footwear dates back to the beginning of the present century. Many patents were issued in the early 1900's, but the idea did not become a practicable reality until the late 1920's or early 1930's. There is a difference of opinion as to who really produced the first direct molded footwear. Heinz Rollman claims priority for having produced such footwear at the Romika Co. plant near Cologne, Germany, in 1932. The Bata Shoe Co., Zlin, Czechoslovakia, likewise claims priority by stating that they produced direct molded footwear in the late 1920's.

The depression era of the 1930's stimulated the quick acceptance of the more economical method of shoemaking, not only in Germany and Czechoslovakia, but in Italy, Spain, Denmark, and Sweden, and then later in England. It is reported reliably that more shoes are made now in Europe and behind the Iron Curtain by the direct molded process than by any other method.

In the United States, history may be said "to be repeating itself" with the introduction in the 1940-1950 period of the direct molded process from Europe. In the early 1920's, William Bresnahan, of Compo Shoe Machinery Co., Boston, Mass., brought from Germany a new cement process for attaching the soles of women's shoes instead of the conventional stitching. His efforts to introduce the cement shoe process here met with considerable skepticism—it just wasn't practicable—would not be acceptable. Bresnahan's judgment was completely vindicated, however, in that the majority of women's shoes for many years, as many as several hundred million pairs annually, has been produced by the cement process since the mid-1920's.

Now some 30 years later, the production of direct molded footwear, which has been produced in Europe for almost the same length of time, is reaching sizable proportions in the United States. In spite of the initial skepticism which met the introduction of this new process, the production of direct molded footwear has shown a steady increase in volume since its introduction in the U.S. in 1940, and it appears certain that production of this type of footwear is here to stay.

The Author

William E. Kavenagh

William E. Kavenagh, consultant, J. M. Huber Corp., has had a long and varied career in the rubber industry. He was first employed by the International Automobile & Tire Co., Chelsea, Mass., in 1899 and then by Goodyear Tire & Rubber Co., Akron, O., 1900 to 1904. He entered Harvard University in 1904 and was graduated in 1908.

Mr. Kavenagh returned to Goodyear in Akron in 1908 and from 1910 until 1914 was concerned with starting up the first Goodyear plant outside the United States. He returned to the Akron Goodyear plant in 1914 in the mechanical goods development department. From 1916 to 1918, Mr. Kavenagh did consulting work and from 1918 to 1921 was factory manager of the Plymouth Rubber Co., Canton, Mass. Between 1922 and 1925 he established heel departments at the Ajax Rubber Co., Binghamton, N. Y., and the Bloomingdale Rubber Co., Butler, N. J. During the period 1923 to 1925 he was engaged with his brother, Carl Kavenagh, at the Spartan Rubber Co., Yardville, N. J., in tire manufacturing.

The author returned to Goodyear at Akron in 1925 as head of the tire and tube and repair materials tire section. He became development manager of the shoe products division of Goodyear in Akron in 1930, where he remained until he was transferred in 1936 to become director of research and development of Goodyear's shoe products division at Windsor, Vt. He retired from Goodyear in 1957. He joined the J. M. Huber Corp. as a consultant in mid-1957.

During World War II, Mr. Kavenagh served on several government committees. While with Goodyear he received in the early 1940's the Paul W. and Florence B. Litchfield Award for his part in the development of Neolite sole and heel material.

DMF Machines and Products

Many machines are available for the manufacture of direct molded footwear (DMF), from several European countries, from Japan, and the United States, but only a few of the foreign machines have been offered on the American market.

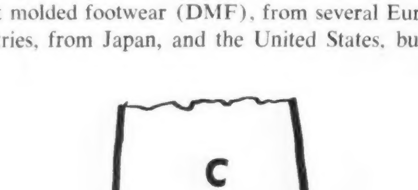


Fig. 1. Schematic diagram of internal-pressure machine for direct molded footwear. *A* is electrically heated fixed metal base which may be plain or carry a design for the sole bottom. *B* is the ring which forms the mold cavity and is mounted on the base plate. The ring may be solid or split and may or may not be electrically heated. Split rings facilitate removal of the vulcanized shoe. *C* is the heated metal last upon which the upper (usually string lasted) is fitted; the last fits over the ring cavity and is securely held in place mechanically. *D* is unvulcanized rubber compound containing blowing agent which only partially fills mold cavity

Machines are of the internal- and external-pressure types. The latter is further subdivided into the low-pressure and high-pressure types. By external pressure is meant that the molding pressure is provided by manual, pneumatic, or hydraulic means in contrast to molding pressure developed by the blowing agent in the rubber compound during vulcanization with the internal-pressure type.

Internal-Pressure Type

A great variety of internal-pressure type machines is available for the production of direct molded footwear with sponge rubber soles. Wellco Shoe Corp. pioneered this development and has established world-wide affiliations through its licensing and development division known as Ro-Search, Inc. Machines are on the market from Italy, England, Germany, and France and other countries also. Although there are many variations in design, these machines all operate on the same principle of the development of adequate molding pressure from the gas generated by the blowing agent in the sole compound.

Figure 1 is a schematic diagram of the internal-pressure type machine, and Figures 2 and 3 show a Wellco and a Desma machine, respectively. The Desma is a German machine marketed in this country by the International Vulcanizing Corp., Boston, Mass.

Direct Molded Footwear

The direct molding of sponge or solid rubber soles and heels to either cloth or leather uppers, which was developed in Europe in the 1930's and introduced into the United States in the 1940's, is now reaching sizable proportions in these United States.

Machinery and equipment for the direct molding of rubber footwear is covered in the first installment and the compounding and processing of the rubber sole and heel compounds used are covered in the second installment of this two-part article.

Machines for the direct molding of rubber footwear are of the internal- and external-pressure types, and the latter is further subdivided into low- and high-pressure types. Internal-pressure machines depend on the pressure developed during curing from the blowing agent in the rubber compound for molding; while manual, air, or hydraulic pressure is required for this purpose by the external-pressure machines, since solid rubber soles and heels are involved. The essential features of the construction and operation of both internal- and external-pressure machines and illustrations of some of the shoe products made on these machines are covered in this first installment.

Efficient, economical operation of the expensive equipment for the direct molding of rubber footwear requires compounds with much faster curing cycles than those used for the manufacture of conventional soles and heels as such. These compounds for direct molding must have the lowest practical Mooney plasticity for proper processing, and although they must be fast curing, they must also have good shelf life. Compounds for use in internal-pressure machines are more heavily plasticized than those for use in external-pressure machines; while those for external-pressure machines must have somewhat different properties, depending on whether they are wanted for high- or low-pressure use. Examples of compounds and information on the mixing and processing of these several types of compounds will be given in the second installment.

Included also will be information on the compounding and production of a new and better Army boot by the direct molding process and improvement in the production of footwear with microcellular soles by this process.

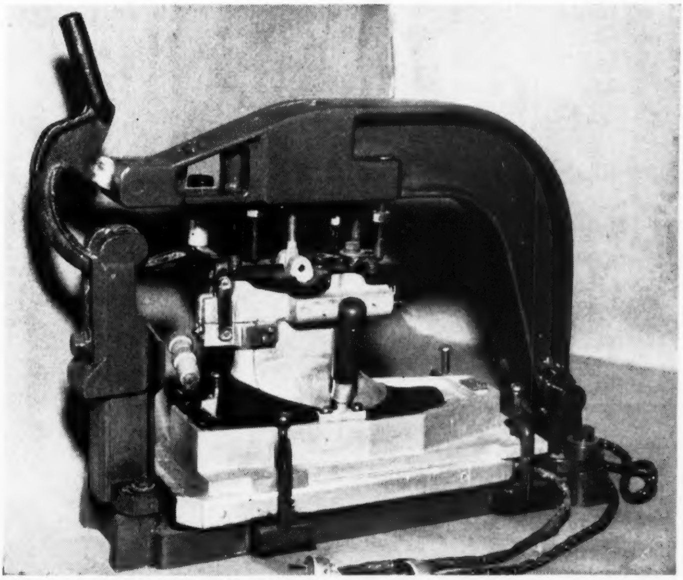


Fig. 2. Wellco Shoe Corp. internal pressure machine showing locking device (handle, *top left*) and shoe in mold

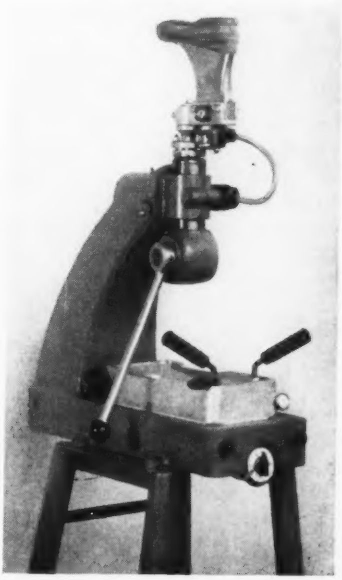


Fig. 3. Desma internal-pressure footwear molding machine

Fig. 4. String-lasted upper *(left)* and finished casual shoe *(right)* which was made in either an internal-pressure or low external-pressure machine

In actual production with internal-pressure machines, the sponge rubber sole is frequently backed up on the wearing side with a thin ply of semi-vulcanized, longer-wearing solid rubber sole compound.

Another modification of sponge rubber-type footwear, particularly for the men's shoes with sole with a relatively thick edge, involves a "wrap" or "skin" of thin solid vulcanizable rubber around the sponge sole and heel. This "foxing" effect serves not only to improve the appearance of the shoe by covering up the porous edge of the sponge sole, but provides for longer wear as well.

Footwear made with internal-pressure machines consists mainly of slippers, women's lightweight casual outdoor shoes, men's heavy-edge-sole shoes with cloth uppers, and felt slippers.

Figure 4 shows a string-lasted upper and the finished women's casual shoe which can be made on internal-pressure machines or low external-pressure machines. The string is stitched around the edge of the upper so that when the upper is pulled tightly over the heated metal last, the string can be tied to hold the upper in place before the last is clamped over the mold cavity containing the unvulcanized sponge rubber. With the application of heat to this assembly, a completely molded shoe is removed from the machinery in four to eight minutes.

External-Pressure Machines

It has been estimated that there are at least 20 different makes of external-pressure machines being manufactured throughout the world for the manufacture of direct molded footwear. A few of these develop molding pressure manually, but the majority uses air or hydraulic pressure for this purpose.

The external-pressure machines of the low-pressure type, which operate on an air pressure of 200 to 400 psi. on the base mold, are designed specifically for the manufacture of lightweight footwear such as women's casuals and flatties, tennis and basketball shoes, and men's casuals with cloth uppers. Machines of the high-pressure type are built to operate at a total pressure up to and beyond 30,000 pounds. These machines are used for the manufacture of men's dress and work shoes and shoes for the Armed Services, but with pressure adjustments may be used to produce lighter weight shoes as well.

In every case with the high-pressure machines, molding pressure is developed to insure proper bonding of the rubber sole and heel to the upper or welt (Ro-Search-type shoe construction) by air or hydraulic means. The necessary total pressure on the movable base is applied either from the bottom up, or the top down, through the metal last.

Fig. 5. Ro-Search M-30 machine which may be used for either low- or high-pressure molding

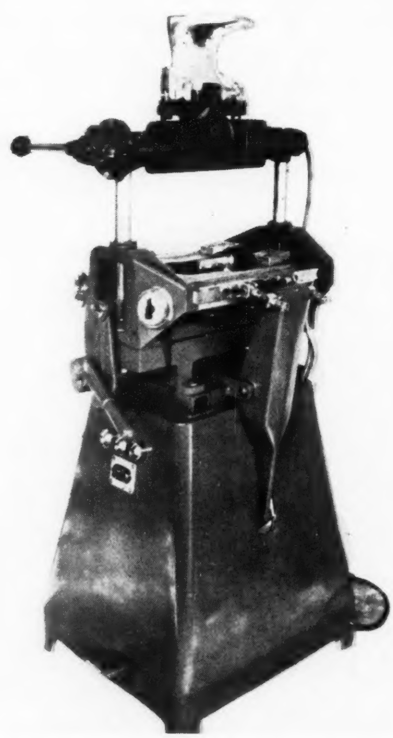


Fig. 6. Nova NVP 57/P which may be used as either low- or high-pressure machine

The mold and last assembly is essentially the same for both low- and high-pressure machines, differing primarily in that the metal last is usually heated electrically in low-pressure machines; while in high-pressure

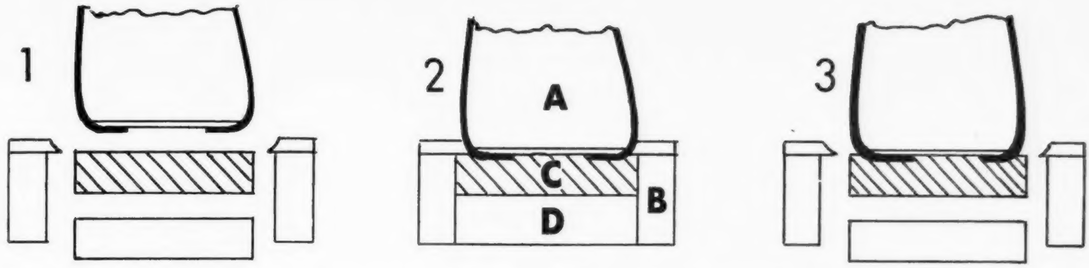


Fig. 7. Schematic diagrams of mold and last assembly for external pressure machines: (1) Mold open, upper on last. (2) Mold closed and under curing pressure. (3) Cure completed, mold has opened automatically. *A* is metal last with upper; heated for low pressure; no heat for high pressure. *B* is electrically heated movable side rings. *C* is unvulcanized sole and heel rubber. *D* is hydraulically operated, electrically heated mold base

machines, more often used with leather uppers, no heat is applied to the last. Low-pressure machines are usually equipped with aluminum lasts; while the high-pressure machines have steel or high-strength steel alloy lasts. Figures 5 and 6 show two different low-pressure machines.

Figure 7 illustrates schematically a typical mold and last assembly of an external-pressure type machine; while Figure 8 shows an actual mold assembly. Operating procedure for this type of machine is essentially as follows: (1) The upper, which has been previously lasted on a wood last, is positioned over the metal curing last. (2) Side molds are closed. (3) Rubber sole and heel "slugs" are positioned in mold cavity, together with any filler, shank piece, or fiber heel plug. (4) Lasted upper is fitted directly over side mold cavity. (5) Button or lever is pushed to start pressure and heat cycle. (6) Molds open automatically at end of curing cycle. (7) Vulcanized shoe is removed. (8) New upper is placed on last. (9) Cycle is repeated.

All modern equipment includes automatic temperature, pressure, and time controls. One operator can usually handle four or more machines, depending on the length of the vulcanization cycle. Some machines have a double-last combination which cures a pair of shoes simultaneously. Others have single-foot, double lasts mounted in such a manner that one last is curing while the other is being fitted with an upper, and when the bottom last is cured, then the top last is rotated into curing position.

The many advantages of the direct molded method over the conventional manufacturing method is illustrated in the case of men's work shoes of the type shown in Figure 9. The elimination of some 20 manufacturing operations plus 10 or more component parts, savings in material and labor and floor space with the direct method result in real economy and dollar savings. In addition, there are improvements in the end-product in that the rubber bond to the upper is not only more waterproof than the conventional construction, but contributes to much longer shoe life.

Fig. 8. Mold assembly for use with external-pressure machines

Fig. 9. Work shoe upper for DMF, *left*, and upper after welting for conventional stitched-on soles, *right*

British United Machine. The machine made by British United Vulcanizing Machinery Co. and distributed in this country by United Shoe Machinery Corp., Boston, Mass., is shown in Figure 10. These machines are usually operated as a battery of nine units such as the one shown (each handling a pair of shoes), all powered and controlled from one central source. Heat for vulcanization is supplied electrically, and molding pressures up to 1,000 psi. may be obtained. A two-state pressure system is used to provide relatively low pres-

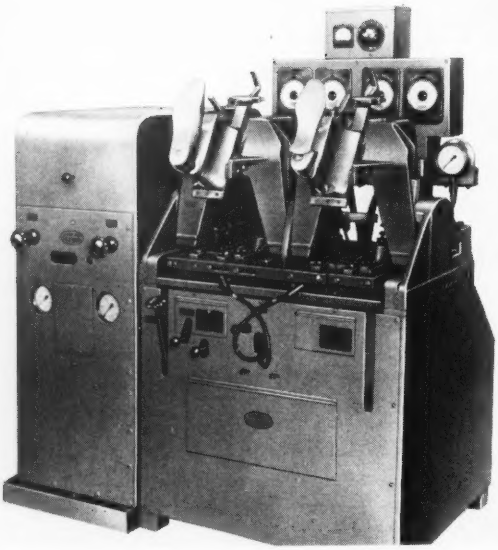


Fig. 10. British United Vulcanizing Co. machine with pressure and control unit for battery of nine such machines at left

sure when the molds are first closed, followed by high pressure for the proper bonding of the rubber to the upper.

British United recently developed a lighter, low-pressure machine for the manufacture of lightweight footwear; also for use with microcellular bottoms, this latter is definitely a new development.

CEMA MACHINE. This machine was invented by Gonzalo Mediano, Barcelona, Spain, and has been brought to its present degree of development by C. I. C. Engineering, Ltd., Street, Somerset, England, with offices in Boston, Mass., also. (See Figure 11.)

The present machine has automatically controlled time and temperature cycles and electrically heated molds and provides hydraulic pressure up to 1,000 psi. on side and sole molds. Molding pressure is adjustable for different sizes and types of shoes. The machine is built with interchangeable molds and fittings and has a two-piece last with detachable heel piece that simplifies the lasting operation. Each machine handles a pair of shoes per cycle.

DESMA MACHINES. Desma is a German machine made in this country by the International Vulcanizing Corp., Boston, Mass. Three models are available, as follows: (1) internal pressure; (2) low-external pressure; (3) high external pressure. Molds for all three types are made by IVC to American standards. Heel pins in the mold provide cores in the finished heel so that less rubber is required, and a lighter finished product results. (See Figure 12.)

External-pressure machines use compressed air from regular factory compressors. The low-pressure machines are designed for the usual lightweight footwear. A patented string-lasting operation eliminates machinery and labor required for conventional lasting-room operations.

The Desma machine's single (same) foot, double-last feature speeds up manufacturing operations. While the shoe on the lower last is being vulcanized, the upper last is fitted with another upper, and on completion of the cure on the lower last the assembly is rotated, and a new shoe is ready for vulcanization.

In the high-pressure molding of certain leather-upper shoes, IVC has developed the use of a rubber gasket which is placed inside the shoe in place of the bottom part of the metal last to protect the leather upper and seams from most of the force of the side mold "bite" during molding and vulcanization.

Low-pressure machines have automatic heat control for the last, side rings, and base mold; while the high-pressure machines used mostly with leather uppers have heat and control for the side and base mold only. The usual time and pressure controls are also included.

NOVA MACHINES. The Nova machines are handled in this country by Atlas Shoe & Sewing Machine Co., New York, N. Y.

Five models are available as follows: NPV 50/A is a small internal-pressure type machine, hand operated, for slippers with sponge rubber soling and for children's shoes for which a semi-compact rubber mixture is used. NPV 51/P is a semi-automatic machine; pressure (air) is applied only from the bottom. NPV 52/P is a fully automatic air-operated machine. NPV 57/P is a fully automatic air-operated machine, slightly lighter in construction than 52/P. NPV 53/I is a fully automatic machine employing hydraulic pressure and is shown in Figure 13.

NPV 57/P is designed for lightweight ladies' and children's shoes with leather or fabric uppers. NPV 53/I is designed for heavy work shoes and military boots, but can also be used for men's, ladies', and children's street footwear with leather uppers.

Lasts, side rings, and bottom plates on all machines have automatically controlled heat. The lasts on these machines have a movable heel piece so that damage to the shoe upper is avoided in handling. The NPV 53/I

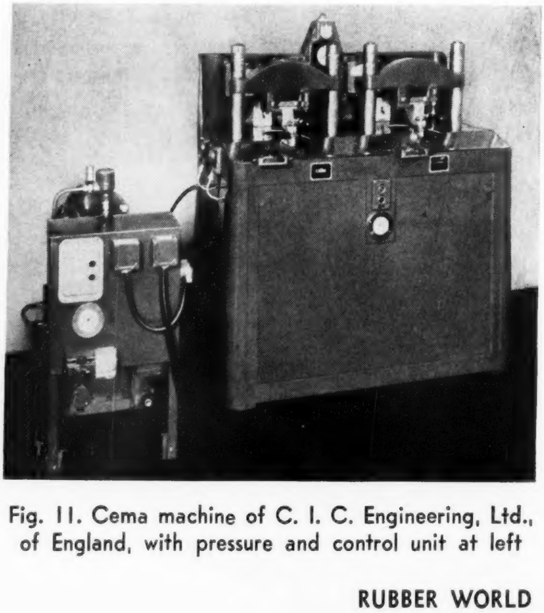


Fig. 11. Cema machine of C. I. C. Engineering, Ltd., of England, with pressure and control unit at left

Fig. 12. Desma machine (International Vulcanizing Corp., Boston, Mass.), showing single-foot opposite-mounted lasts

machine can be operated without heated last since sufficient pressure is available to bond the rubber sole to the leather upper, and this-type operation avoids possible overheating and resulting damage of the upper leather or insole material.

The air-operated NPY 57/P can develop a maximum pressure of 10 tons; the hydraulic NPV 53/I machine, a maximum pressure of 36 tons. On both machines the thickness of the sole can be changed within quite a wide range for the same type of molds. Exchange of molds in the machine can be accomplished in 15 minutes for a pair of machines.

Ro-Search Process 82 Machines

Ro-Search (Wellco Shoe Corp.) Process 82 machine, PV-30, shown in Figure 14, has available a total pressure up to 30,000 pounds and includes automatic controls for time, temperature, and pressure. One feature is a control that will not permit the press to close unless the upper and sole and heel rubber are properly in place. An automatic resetting electrical timer variable to a maximum 15-minute period assures the proper vulcanizing cycle and insures that the press opens at the completion of the cycle. Signal lights indicate how the heaters are functioning, and pressure regulating valves and speed control valves are supplied on each machine.

Hydraulic pressure moves the top platen down to close the mold and at the same time moves the positive steel clamp over the tapered external faces of the side frames so that they are securely locked into position.

Unlike with other direct molding equipment, the rubber sole is bonded to the welt (a strip of leather sewed to the bottom of the upper and to which the outer sole is applied) and a ¼-inch skived margin of the upper that extends inward beyond the welt. The uppers are *not* prelasted in the conventional manner, but they are preformed on simple heated equipment to give sufficient shape to allow the welted upper to be drawn on to the last where it is formed to fit around the complete periphery by the mold side frames that engage under the welt. Once the side frames are closed, the insole filler, heel shank, and rubber are loaded into the mold. No roughening of leather or cementing is necessary.

Molds for the Process 82 machine are self-contained, with the adjusting mechanism incorporated within the mold itself. Adjustments are rarely necessary, but, if so, are easily accomplished. The machine and molds

Fig. 13. Nova (Atlas Shoe & Sewing Machine Co., New York, N. Y.) NPV 53/I high-pressure model showing last, side rings, etc.

are designed for rapid changing, and only three minutes are required to change a mold.

This machine is suited for the production of shoes with heavy, deep cleated, and hard soles, and Army combat boots are in this category.

Skolast Machines

Ab Svenska Skolastfabriken of Sweden manufactures the Minipress, a low-pressure machine for casual shoes and slippers, and a high-pressure machine, the Goliath (Figure 15), designed to produce all kinds of rubber soled footwear. The Randolph Machine Co., Randolph, Mass., is the exclusive U. S. agent for these machines.

Accurately controlled hydraulic pressure from an oil hydraulic system built to service two Goliath machines makes this press adaptable to the molding of shoes with either leather or canvas uppers. Total ram pressure of 15 tons equivalent to a maximum of 1,000 psi. on the mold is developed. Time and temperature controls assure maintenance of predetermined cycles of operation.

A unique feature of the Goliath machine is the "Y" slotted loading table which permits fast loading of the last under the mold from one arm of the "Y" while the other arm holds a second loaded last ready for vulcanization as soon as the first is completed.

Skolast will soon introduce the Marvel press, a machine designed to vulcanize lightweight microcellular soles directly to leather or fabric uppers. Engineering details and operational procedure are not yet available, however, on this new press.

(To be continued)

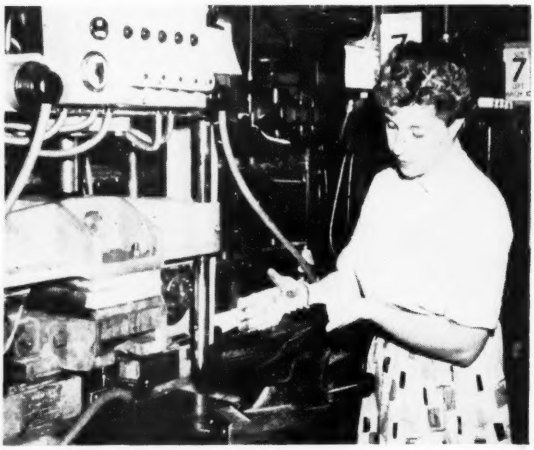


Fig. 15. Skolast (Randolph Machine Co., Randolph, Mass.) Goliath machine with "Y" loading table

Fig. 14. Ro-Search Process 82 (Wellco Shoe Corp.) Model PV-30 machine showing last, mold, etc.

Eliminate Unsafe Conditions

The Safety News Letter of the Rubber Section of the National Safety Council, Chicago, Ill., has some very good advice on the proper attitude toward safety measures. It suggests that there is an alarming tendency today to sidestep precautionary measures with the reasoning that accidents are due to unsafe acts. Devoting all safety emphasis on promotional schemes such as contests, gimmicks, and flag waving leaves one major area of prevention untouched: that of making the job safe.

The letter states that it is a known fact that accidents can be prevented, and people can perform their jobs safely if attention is directed toward making the job as safe as possible in the first place. As an example, a guard for a calender roll windup is used. If a man catches his hand in the rolls while operating the machine, the accident would be listed as being caused by an unsafe act. If, however, the guard is in place, it would be difficult for him to get his hands caught in the roll, and the accident would not happen.

Classifying accidents in this way can therefore be misleading. If a job has always been done in a certain way, and then suddenly an accident happens, we are prone to feel that an unsafe act has been committed. It is the easy way out, but does not prevent the accident.

The safety engineer today must still be an engineer, and with his experience in the accident prevention field, he must be constantly alert to devising methods for the prevention of accidents. To find and correct potential trouble spots before there is an opportunity for someone to be hurt is the best safety program.

Comparative Performance of Antiozonants In Road and Accelerated Tests In the Los Angeles Area[1]

By FRANK B. SMITH

Naugatuck Chemical Division, United States Rubber Co., Naugatuck, Conn.

TABLE 1

Types of Tire Cracking	Locus of Crack
1. Groove cracking	Tread channels
2. Radial cracking	Sidewall
3. Circumferential cracking	Sidewall
4. Weather checking	Tread and sidewall
a. Surface oxidation	Tread and sidewall
b. Ozone checking	Tread and sidewall

IT IS a startling thought that the air we breathe, which sustains our very lives, is also capable of severely damaging the tires on our automobiles. The culprit here is largely ozone; although oxygen also causes rubber to deteriorate. Even so, the modern automobile or truck tire is much more durable than its early predecessor of 50 years ago. Stronger tire cords, carbon blacks that provide better wearing treads, more effective rubber chemicals, and tougher polymers are examples of the scientific developments that have made possible major tire improvements.

The service given by today's tires is all the more spectacular considering the concurrent increases in motor horsepower, speeds, and payloads to which modern tires are subjected. Perhaps the most notable tire improvement during this period has been a vast increase in tire mileage, of the order of 1000% since 1909. However, had there not been proportional improvements in tire-flexing resistance and in tire-cracking resistance, the increased tread wear might never have been realized. Uncontrolled cracking can cause tires to fail long before the tread is worn out.

Tire Cracking and Its Prevention

Tire cracking is conveniently classified as shown in Table 1 and illustrated in Figure 1.

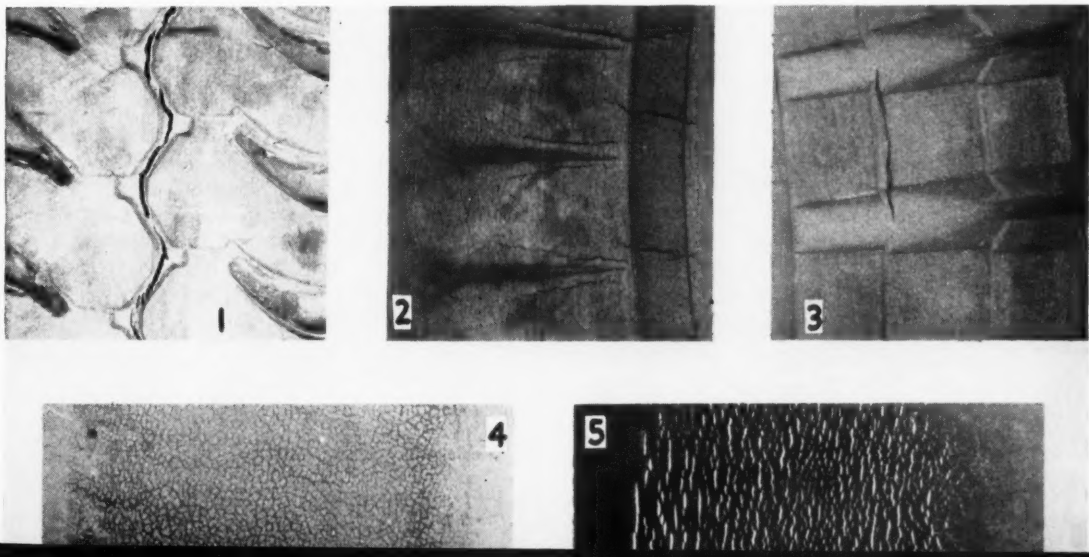
Control of cracking has been achieved in the past largely through the use of chemical additives or by modification of tire design. Reduction in groove cracking has more recently been obtained by the process of post-inflating tires after vulcanization.

Chemicals which retard tire cracking fall into two general classes: (a) flex-cracking inhibitors such as B-L-E (reaction product of acetone and diphenylamine) and D.p.p.d. (N,N'diphenyl-p-phenylene diamine); (b) antiozonants such as P.C.p.p.d. (N-phenyl-N'cyclohexyl-p-phenylene diamine).

Flex-cracking inhibitors have been used in tires for many years. In contrast, the use of chemical antiozonants is relatively new, having burgeoned during this

[1] Presented before the Division of Rubber Chemistry, ACS, Los Angeles, Calif., May 14, 1959.

Fig. 1. The various types of cracks which develop in tires are: (1) groove cracking, (2) radial cracking, (3) circumferential cracking, (4) those due to surface oxidation, and (5) ozone checking



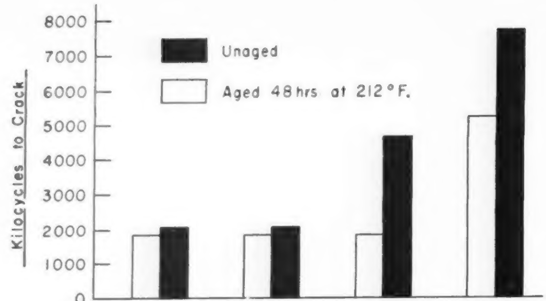


Fig. 2. Ozone cracking in SBR sidewall Compound C on Naugatuck Chemical's outdoor dynamic test

decade from virtually nil to an estimated total of 10-15 million pounds in recent years. This rapid expansion in the use of antiozonants appears to be directly related to a species of air pollution characterized by excessive concentrations of oxidants (principally ozone) which has developed in certain areas of the country.

In Los Angeles the air pollution is commonly known as "smog." The presence of ozone in Los Angeles smog has been amply documented by C. E. Bradley and A. J. Hagen-Smit in several technical reports.[2, 3] Concentrations of oxidant in the Los Angeles area are measured daily in a number of locations by the Air Pollution Control District (A.P.C.D.) of the County of Los Angeles. The oxidant levels often exceed 25 p.p.h.m. (parts per hundred million) and have been reported to be as high as 90 p.p.h.m. Ozone concentrations as low as 2 p.p.h.m. are known to cause rubber compounds to crack when under strain. The Los Angeles area is, therefore, a suitable location for testing anticracking chemicals in tires. It combines long hours of sunlight, high ozone levels, excellent highways, relatively large daily temperature changes, and hilly terrain.

In this paper antiozonant effectiveness is evaluated principally in tire tests. Multiple-section tires containing a different antiozonant in each section were tested on vehicles at Los Angeles. Similar tires were tested on a tire weathering wheel which was also located in Los Angeles.

Fig. 3. Standard samples of ozone cracking in sidewalls and treads used in this study for comparison

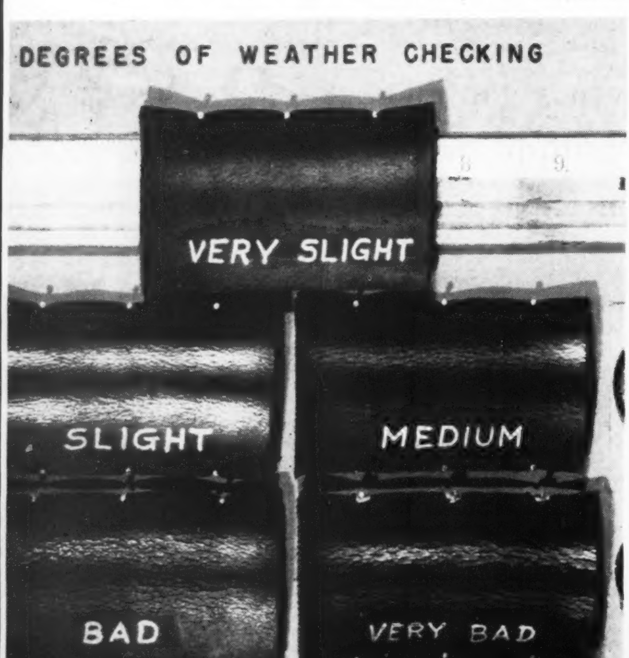


TABLE 2. ANTIOZONANTS TESTED

Chemical name	Abbreviation	Trade Name
1. N-isopropyl N'phenyl-p-phenylene diamine	I.P.p.p.d.	Flexzone 3-C*
2. N-phenyl-N'cyclohexyl-p-phenylene diamine	P.C.p.p.d.	Flexzone 6-H*
3. 6-Ethoxy-1,2-dihydro-2,2,4-trimethyl quinoline	E.D.T.m.q.	Santoflex AW†
4. N,N'-di (1-ethyl-3 methyl-pentyl) p-phenylene diamine	(EMP)$_2$p.p.d.	UOP-88‡
5. N,N'-di- (1-methyl-heptyl) p-phenylene diamine	(MH)$_2$p.p.d.	UOP-288‡
6. Di-phenyl p-phenylene diamine homologs	(D.p.p.d.)$_h$	Wingstay 100§

* Naugatuck Chemical.
† Monsanto Chemical Co., Akron, O.
‡ Universal Oil Products Co., Des Plaines, Ill.
§ Goodyear Tire & Rubber Co., Akron.

Naugatuck Chemical's tire weathering wheel is described in a previous paper by F. B. Smith and W. F. Tuley.[4] Also described in the cited paper is an outdoor dynamic laboratory cracking test which is referred to in this paper. The cited paper showed that ozone cracking ratings obtained on the test wheel correlate well with ozone cracking ratings on similar tires road tested at Los Angeles.

This paper shows antiozonant performance in both passenger-car tires and in truck tires. It deals with the chemicals previously studied and demonstrates the performance characteristics of a powerful new chemical, N-isopropyl N'phenyl-p-phenylene diamine, which is being introduced to the rubber industry. Commercially, this chemical is known as Flexzone 3-C.[5]

The antiozonants tested in this work are listed in Table 2.

The actual compounds used in this study are shown in Table 3. Sidewall A is a blend of natural rubber and SBR 1500, containing 50 parts of each. Sidewall B is an SBR compound containing both SBR 1500 and SBR 1711. The latter was designed for unit tread and sidewall extrusion and the tire treads containing Sidewall B were processed in a single-piece extrusion. Sidewall C is a conventional SBR compound. Truck Tread #1 is a conventional truck tread compound based entirely on natural rubber. The sidewall compounds contain wax, but the truck tread contains no wax.

[2] A. J. Hagen-Smit, C. E. Bradley, M. M. Fox, *Ind. Eng. Chem.*, Sept., 1953, p. 2086.
[3] A. J. Hagen-Smit, ASTM Spec. Tech. Publication No. 229, "Symposium on Effect of Ozone on Rubber," p. 3 (1958).
[4] "Accelerated Testing of Ozone Cracking Inhibitors." RUBBER WORLD, May, 1959, p. 243.
[5] F. B. Smith, Compounding Research Report No. 43, "Flexzone 3-C." Naugatuck Chemical Division, United States Rubber Co., Naugatuck, Conn.

TABLE 3. COMPOUNDS USED IN THE ANTIOZONANT COMPARISONS

	Sidewall A	Sidewall B	Sidewall C	Truck Tread #1
#1 Smoked sheets	50.00	—	—	100.00
SBR 1500	50.00	50.00	100.00	—
1711	—	68.75	—	—
Whole tire reclaim*	30.00	—	30.00	—
HAF black	—	36.77	—	45.00
FEF black	40.00	18.23	45.00	—
Para Flux†	—	8.00	8.00	—
Pine tar	—	—	—	4.50
Process oil	8.00	—	—	—
Stearic acid	2.00	2.00	1.00	4.50
B-L-E-25‡	0.75	1.00	1.00	—
Flexamine§	0.70	1.00	—	—
Zinc oxide	3.00	3.00	3.00	4.50
Sunproof improved wax‡	2.00	1.00	2.00	—
Antiozonant	as shown	as shown	as shown	as shown
MBT	—	0.60	—	—
DPG	—	0.50	—	—
Delac S‖	0.70	—	1.10	0.45
Sulfur	2.40	2.25	2.50	2.50
Physical properties: samples cured 90 min. at 292° F.				
Modulus at 300% E, psi.	1140	1330	990	1850
Tensile strength, psi.	2240	2840	2160	3580
Elongation, %	520	550	590	520
Hardness, Shore A durometer	56	57	59	64

* #667, Naugatuck Chemical.
† C. P. Hall Co., Akron, O.
‡ Naugatuck Chemical.
§ 65% complex diarylamine-ketone reaction product; 35% N,N'-diphenyl-p-phenylene diamine, Naugatuck Chemical.
‖ N-cyclohexyl-2-benzothiazole sulfenamide, Naugatuck Chemical.

Antiozonants Rated in Tires

Since it has been fairly well established that ozone protection afforded by chemical additives must be proved in actual outdoor service, this paper contains results of many tests evaluating antiozonant service in road tests and in the outdoor weathering wheel test which has proved to be quite reliable in correlation with road testing.

The tests were run mostly in Los Angeles during months with high oxidant levels as measured by the Air Pollution Control District of the County of Los Angeles. Check runs were also made in other parts of the country to substantiate these findings and to confirm that this Los Angeles area has particularly severe conditions.

The test results are used to show that the ozone protection afforded both passenger-car tires of synthetic rubber and truck tire compounds of natural rubber can be increased substantially by use of the new chemical antiozonant, N-isopropyl N'phenyl-p-phenylene diamine. It is also shown that considerable groove-cracking resistance is obtained by the use of this material in natural and synthetic rubber tread compounds.

Additional data are presented which show the rather good correlation between the outdoor weathering wheel, described in Mr. Smith's article published in RUBBER WORLD earlier this year, and actual road test results.

TABLE 4. OUTDOOR STATIC EXPOSURE TESTING AT LOS ANGELES. TEST STARTED ON OCTOBER 9, 1958. TEST SAMPLES CURED 90 MINUTES AT 292° F.

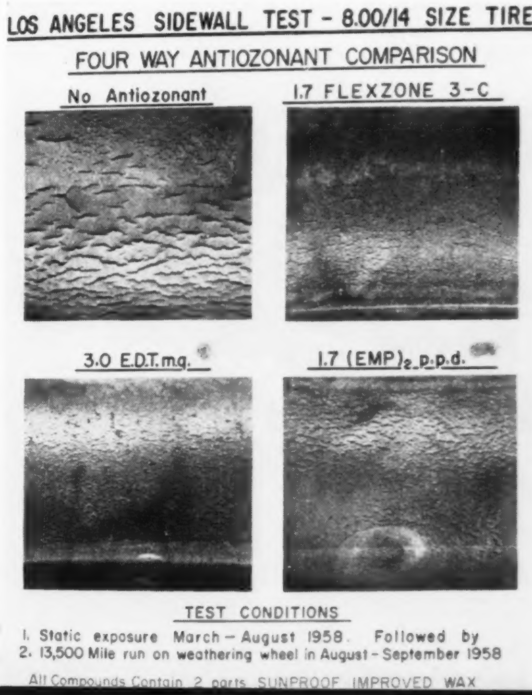
	A	B	C	D	E
Amount of antiozonant	3.0	1.7	1.7	1.7	1.7
Antiozonant	E.D.T.-m.q.	I.P.-p.p.d.	P.C.-p.p.d.	(D.-p.p.d.)$_A$	(EMP)$_2$-p.p.d.
Days to Crack					
Very, very slightly cracked	1	11	1	1	1
Very slightly cracked	123	—	—	4	11
Slightly cracked	—	—	—	5	48
Cracked	—	—	—	27	—

Sidewall Compound Cracking

Figure 2 shows a comparison of relative antiozonant effectiveness on SBR Sidewall C compound evaluated on the Naugatuck outdoor dynamic test. The effect of aging 48 hrs. at 212° F. is illustrated. I.P.p.p.d. is shown to be the strongest protectant under the conditions of test.

Table 4 shows the relative antiozonant activity in out-

Fig. 4. Ozone cracking in buttress area of multiple-section tire exposed to static conditions at Los Angeles followed by 13,500-mile-run on weathering wheel



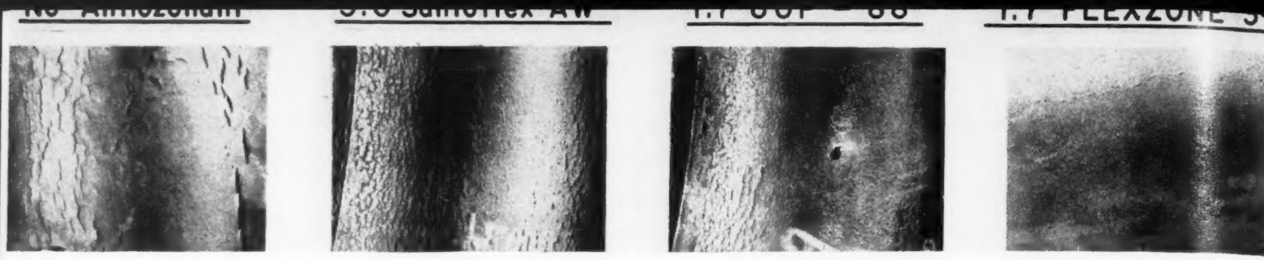


Fig. 5. Ozone cracking on same tire as Fig. 4, but showing the area of the tire above the bead

door static tests[4] at Los Angeles, again in Sidewall C compound. The samples were aged 48 hours at 212° F. before test.

Tire Sidewall Cracking Ratings

The examples of Figure 3 typify the scale of ozone checking which may occur in tire treads and sidewalls. It is presented as a reference point for use in examining the ozone cracking of tire sidewalls. With this reference point the reader may better judge the photographs shown subsequently comparing antiozonant effectiveness in tire sidewalls.

Figure 4 illustrates the degrees of ozone checking developed in the buttress area of a multiple-section tire. The control section (no antiozonant) is shown to be severely cracked. It is seen that the antiozonants vary in their relative effectiveness. In this case, 3.0 E.D.T.m.q. is roughly equal to 1.7 (EMP)$_2$p.p.d. However, 1.7 I.P.p.p.d. seems to impart greater protection. This particular test consisted of a six-month static exposure at Los Angeles (March-August, 1958) followed by a 13,500-mile continuous run on the weathering wheel.

It is noted that ozone checking occurs in the sidewall area above the bead as well as in the buttress area. Figure 5 shows ozone cracking in the bead area of the same tire illustrated in Figure 4. The control section (no antiozonant) shows fewer, but on the average, much deeper cracks than in the Figure 4 pictures of the buttress area. The sections containing the antiozonants E.D.T.m.q. (Santoflex AW) and (EMP)$_2$p.p.d. (UOP-88) show little of the severe cracking found in the control; however, there is a relatively large number of smaller cracks. In contrast, the section containing I.P.p.p.d. (Flexzone 3-C) showed little ozone checking.

Figures 6 and 7 contrast the pattern of ozone cracking developed in buttress and bead areas in a road test at Los Angeles. The ratings as to relative antiozonant effectiveness are in the same order as was found in the weathering wheel test (Figures 4 and 5). The observed ordering of antiozonants in terms of relative protection against ozone checking is similar in both tests. The antiozonants are listed in order of decreasing effectiveness:

1. I.P.p.p.d. (Flexzone 3-C)
2. (EMP)$_2$p.p.d. (UOP-88)
3. E.D.T.m.q. (Santoflex AW)

All antiozonant-protected sections are superior to the control which contained no antiozonant.

By way of comparison, the ozone cracking developed in a weathering wheel test at Naugatuck, Conn., is shown in Figure 8. The duration of the test was 15,480 miles during June-July, 1958. Again the antiozonant I.P.p.p.d. was rated as showing a superior degree of effectiveness. The degree of cracking in all sections is seen as somewhat less severe than that which developed in the Los Angeles tests. The order of the ratings of antiozonant effectiveness, however, is similar for both the Connecticut test and the Los Angeles tests.

Oxidant Levels at Los Angeles

The oxidant levels at Los Angeles during the period of these passenger-tire tests is of interest. This information was obtained through the courtesy of the Air Pollution Control District, County of Los Angeles. The oxidant levels prevailing at the Vernon Station are considered as representative of conditions prevailing at the Naugatuck Chemical test site in Los Angeles.

Figure 9 presents a summation of the A.P.C.D. (Vernon) data in terms of the occurrence of daily maxima of 9 p.p.h.m. or above. The oxidant tests described here cover the period March, 1958, through March, 1959. Evidently the months of July, 1958, through November, 1958, may be considered the season of greatest smog intensity. Additional data are shown in

Fig. 6. Ozone cracking of multiple-section tire run on vehicle at Los Angeles for 12,596 miles, from March 20 to October 29, 1958. Buttress area is shown

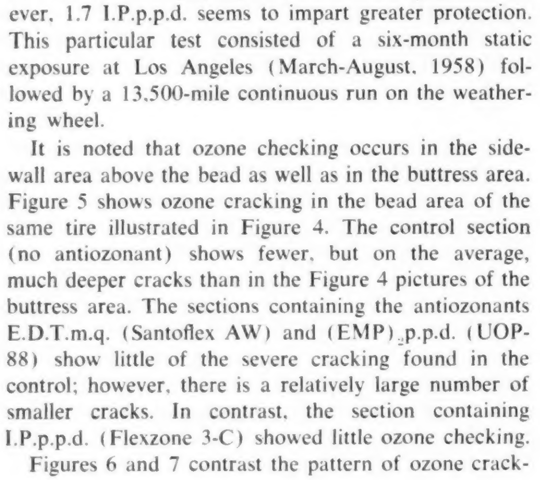


Fig. 7. Ozone cracking on same tire as Fig. 6 except the area of tire shown is above the bead

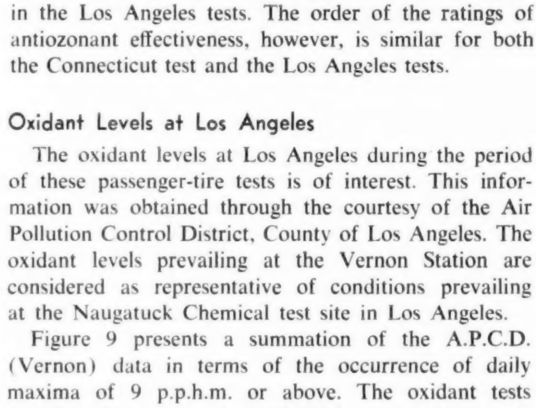


TABLE 5. DAILY OXIDANT MAXIMA, VERNON STATION A.P.C.D., COUNTY OF LOS ANGELES

Month	Range, p.p.h.m.	# Days Reported	Average for Month, p.p.h.m.
March, 1958	3–23	15	7
April, 1958	7–29	14	15
May, 1958	3–29	31	15
June, 1958	5–32	25	14
July, 1958	11–40	31	19
August, 1958	9–22	31	15
September, 1958	3–58	30	24
October, 1958	5–64	31	23
November, 1958	5–61	30	21
December, 1958	3–25	31	14
January, 1959	1–32	30	13
February, 1959	2–24	28	8
March, 1959	6–22	22	13

TABLE 6. SBR SIDEWALL B TIRE TESTS AT LOS ANGELES USING MULTIPLE-SECTION TIRES

Tire Section	Group 1	Group 2
1	1.5 I. P. p.p.d.	1.7 I. P. p.p.d.
2	1.5 P. C. p.p.d.	1.7 P. C. p.p.d.
3	2.0 E. D. T. m.q.	1.7 $(EMP)_2$ p.p.d.

Table 5, for monthly range of oxidant level, the number of days the oxidant level was measured, and the monthly average (p.p.h.m.).

Unit Tread and Sidewall Ratings

Two groups of 8.00-14 nylon tires containing sidewall B compound were tested at Los Angeles. These tires were of unit tread and sidewall construction. The details of the antiozonant comparison are shown in Table 6.

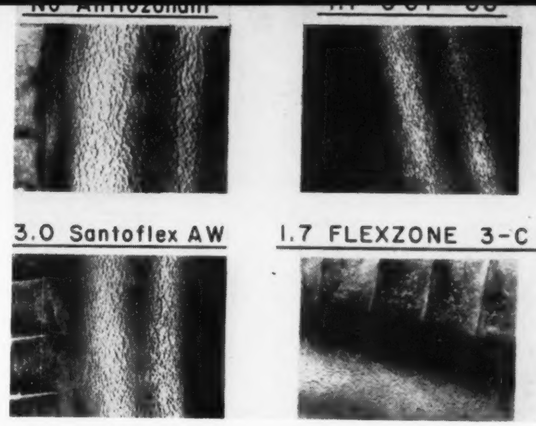


Fig. 8. Check run of tires similar to those exposed at Los Angeles (Figs. 4-7) which were run on the weathering wheel at Naugatuck, Conn.

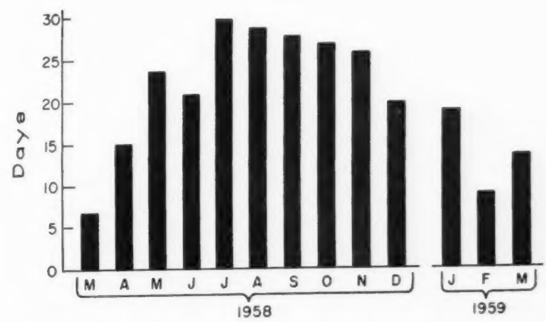
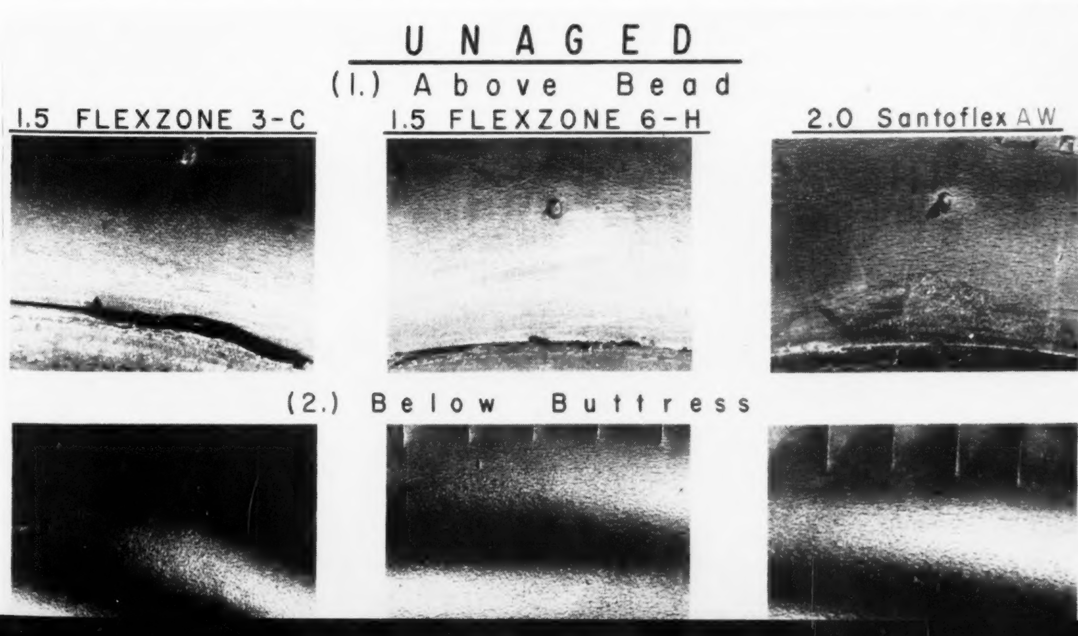


Fig. 9. Oxidant level at Los Angeles for the period of the test showing the number of days in the month where the maxima reached 9 p.p.h.m. or over

A number of the tires in each group were oven aged (at 158° F.) for two weeks prior to test. Comparative tests were made of unaged tires *versus* the aged tires, both on the weathering wheel and on a 1957 station wagon. These weathering-wheel runs were made during the period September 5-November 21, 1958. The road test of the tires was run between August 20, 1958, and

Fig. 10. Ozone cracking on sections of a tire exposed on the weathering wheel for a continuous run of 19,953 miles from October 22 to November 21, 1958, at Los Angeles. Unaged Group I compounds (Table 6)



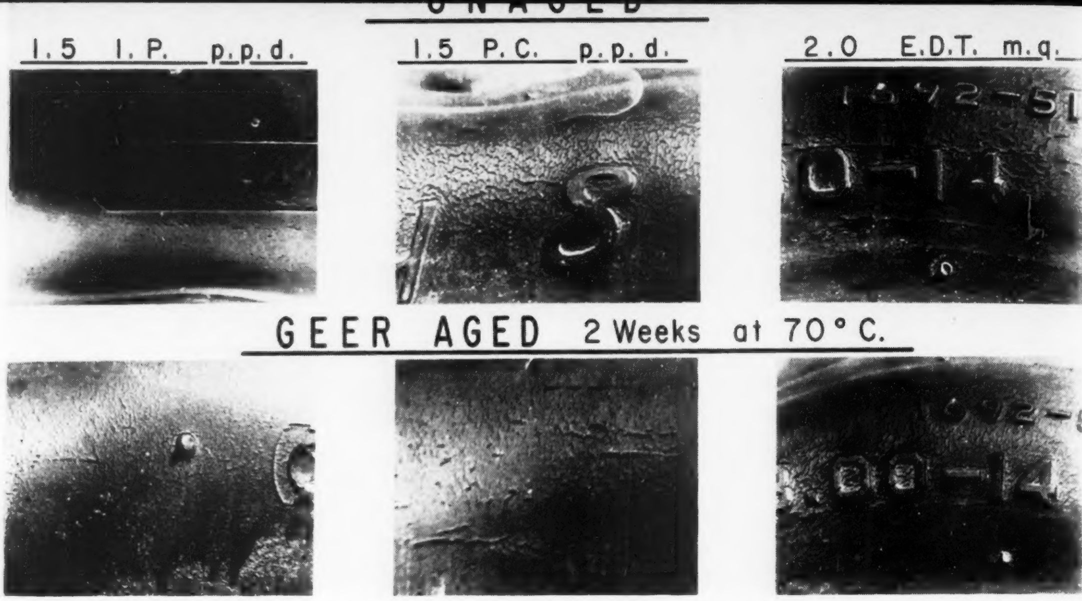


Fig. 11. Ozone cracking on multiple-section tire which was mounted on a vehicle in Los Angeles from August 13, 1958, to March 23, 1959. Total mileage run was 7,675

March 16, 1959. It is evident from Figure 9 and Table 5 that all of these tires were exposed to relatively high concentrations of atmospheric ozone during these test periods.

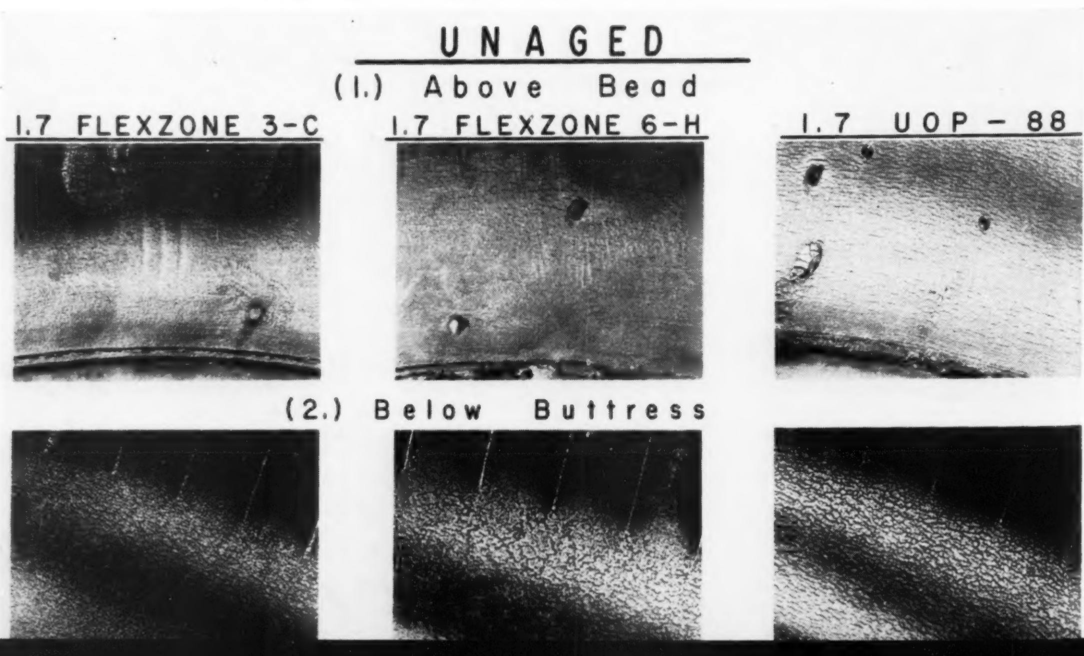
Group 1 Tire Results. Figure 10 illustrates the degree of ozone cracking developed in the sidewall sections of an unaged Group 1 tire. This particular tire was subjected to a continuous run on the weathering wheel at Los Angeles. The period of test was from October 22-November 21, 1958. Mileage was 19,953. The section protected with I.P.p.p.d. (1.5 Flexzone 3-C) showed the least ozone checking, followed in order by the sections containing P.C.p.p.d. (1.5 Flexzone 6-H) and E.D.T.m.q. (2.0 Santoflex AW), respectively.

Figure 11 (upper pictures) demonstrates the relative degrees of ozone cracking developed in the sidewall sections of an unaged Group 1 tire tested on the station wagon. The sidewall section protected with 1.5 I.P.p.p.d. showed the least ozone checking followed in order by the sections containing 1.5 P.C.p.p.d. and 2.0 E.D.T.m.q., respectively.

Figure 11 also illustrates (lower pictures) the relative ozone checking developed in the sidewall sections of an oven-aged Group 1 tire during the Los Angeles road test on the same vehicle. The comparative ratings of antiozonant value are similar for both the aged tire and the unaged tire. It is observed that the aging accentuated the degree of cracking of the E.D.T.m.q. protected section.

Group 2 Tire Results. Figure 12 shows the ozone checking developed in the sidewall sections of an unaged Group 2 tire. This tire was subjected to a continuous run on the weathering wheel during the period October and November, 1958. The mileage was 18,459. The section protected with I.P.p.p.d. (Flexzone 3-C) showed only slight ozone checking. P.C.p.p.d. (Flexzone 6-H) and $(EMP)_2$p.p.d. (UOP-88) are

Fig. 12. Ozone cracking on multiple-section tire containing antiozonant protection of Group 2 tires (Table 6) run on weathering wheel during October and November, 1958, for 18,459 miles



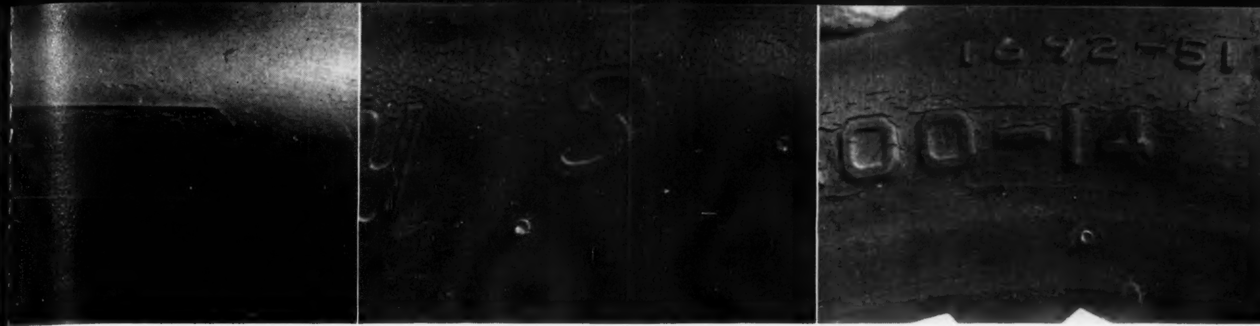


Fig. 13. Tire similar to that in Fig. 12 except mounted on vehicle in Los Angeles and run 7,675 miles. Sections protected by 1.7 parts of antiozonant. *(Left)* Flexzone 3-C; *(center)* Flexzone 6-H; and *(right)* UOP-88

graded second and third, respectively, in protective action.

Figure 13 demonstrates the relative ozone checking developed in the sidewall sections of an unaged Group 2 tire from a Los Angeles road test. The antiozonant I.P.p.p.d. (Flexzone 3-C) showed the least ozone checking, followed by P.C.p.p.d. (Flexzone 6-H) and $(EMP)_2$-p.p.d. (UOP-88). The ratings of antiozonant effectiveness are similar to the gradings obtained on the unaged Group 2 tire (Figure 12) tested on the weathering wheel.

Truck-Tread Groove Cracking

Truck tires tend to grow in service particularly under extreme conditions of overload and high speed service. Nylon-cord truck tires tend to exhibit these growth characteristics to such an extent that the cured tread is placed under tension, making it more susceptible to groove cracking and cuts.[6] The solution to this problem may be approached in two ways: (1) additional processing (at additional cost) such as nylon cord stretching and more recently, the use of the post-inflation processes in tire manufacturing; (2) compounding an anti-cracking chemical into the tread for improved flexing and cracking resistance.

The factory processes under (1) above are complex, and complete elimination of all process variation is difficult to achieve. Process variation may be reflected in variable tire growth characteristics. Therefore, the potential improvement of groove-cracking resistance by chemical means is attractive. Furthermore, the chemical can be used, if necessary, in combination with the above-mentioned cord processes to provide an added degree of protection against groove-cracking.

LABORATORY CRACKING STUDY. In the laboratory the interesting fact was discovered that I.P.p.p.d. imparts significantly improved resistance to the hot (150° F.) flexing characteristics[7] of natural rubber-HAF black truck tread. This result was found in both uninitiated cracking tests (flex-cracking) and in initiated crack growth tests. (Truck Tread Compound #1 is used throughout this part of the paper.)

Figure 14 shows the effect of two levels of I.P.p.p.d. on the hot flex-cracking resistance of Truck Tread #1. Results are expressed in terms of relative rating of flex-cracking resistance compared to the B-L-E-25-D.p.p.d. protected compound which was assigned a value of 100%.

The comparison also includes: (1) a control compound (containing no chemical antiflex cracker); (2) a B-L-E-25-D.p.p.d. analog; (3) a similar compound containing 3.0 E.D.T.m.q.

Figure 14 demonstrates that I.P.p.p.d. produces a major improvement in the 150° F. flex-cracking resistance of Truck Tread #1. The variant containing 3.0 parts I.P.p.p.d. was uncracked when the test was terminated. In contrast, the compound containing 3.0 parts E.D.T.m.q. was comparable to the B-L-E-25-D.p.p.d. protected control compound.

Figure 15 reports the results of a subsequent test with Truck Tread #1 comparing I.P.p.p.d. with $(EMP)_2$p.p.d. and $(MH)_2$p.p.d. (UOP-288) at the 1.5-part level against the B-L-E-25-D.p.p.d. control. Again I.P.p.p.d. exerted a significant improvement in the 150° F. flex-cracking resistance since the I.P.p.p.d. sample was uncracked when the test was terminated. The graph shows that $(EMP)_2$p.p.d. and $(MH)_2$p.p.d. both produced a lower level of flex-cracking resistance than the control compound protected with B-L-E-25 and D.p.p.d.

Initiated crack growth tests (at 150° F.) were run on the same compounds shown in Figure 15. These crack growth data are reported in Figure 16. The plot indicates that I.P.p.p.d. strongly enhances the cut-growth resistance of Truck Tread #1. There was no failure in the I.P.p.p.d.-protected sample when the test was terminated. In contrast, the samples protected with $(EMP)_2$p.p.d. and $(MH)_2$p.p.d. exhibited somewhat lower levels of cut growth resistance than the control which contained B-L-E-25-D.p.p.d.

Figure 17 demonstrates the outdoor dynamic cracking resistance of I.P.p.p.d. at the 1.5 p.h.r. and 2.0 p.h.r. level in combination with B-L-E-25 and Flexamine. It also shows the relative effect with either HAF or ISAF black. For comparison, a compound with 2.0 E.D.T.m.q. is also shown. These samples were run on the Naugatuck outdoor dynamic cracking test apparatus. I.P.p.p.d. is effective with either black.

ROAD TESTS OF TRUCK TIRES. These encouraging laboratory results led to intensive truck tire evaluations of I.P.p.p.d. as groove-cracking inhibitor. The tire tests included three-way comparisons of I.P.p.p.d. at several levels. (0.5-2.0 p.h.r.) contrasted with B-L-E-25-D.p.p.d. as the control anti-flex cracking chemical combination.

Nylon tire constructions were used in all of the

[6] C. G. Wyman, "Post-Inflation: A New Technique for Making Nylon Tires." *Rubber Age* (*N. Y.*), Mar., 1959, p. 955.

[7] ASTM D 813-57T. American Society for Testing Materials, Philadelphia, Pa.

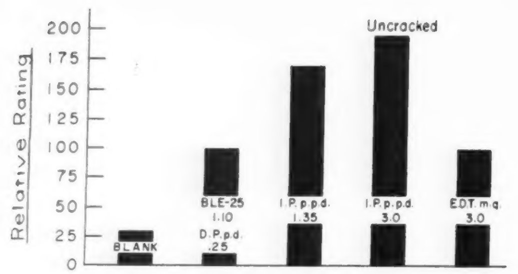


Fig. 14. Flex-cracking of truck tread compound. The B-L-E-25-D.p.p.d. control is assigned a value of 100, and the other compounds are compared to it. This test records results of uninitiated crack growth flexing

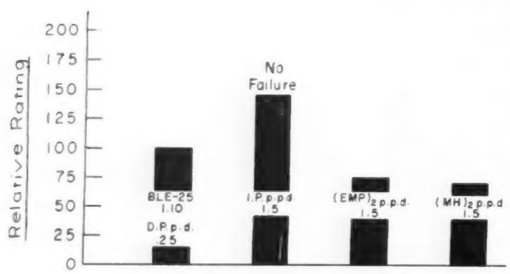


Fig. 15. Additional flex-cracking tests with other antiozonants compared with I.P.p.p.d. and the control compound

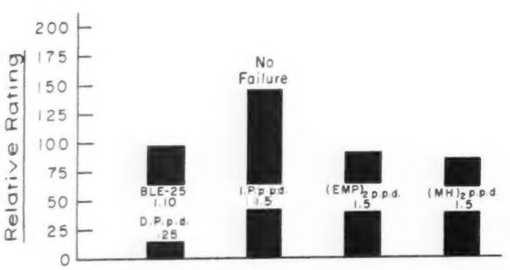


Fig. 16. Results of tests run on same compounds as in Fig. 15 except that crack growth was initiated

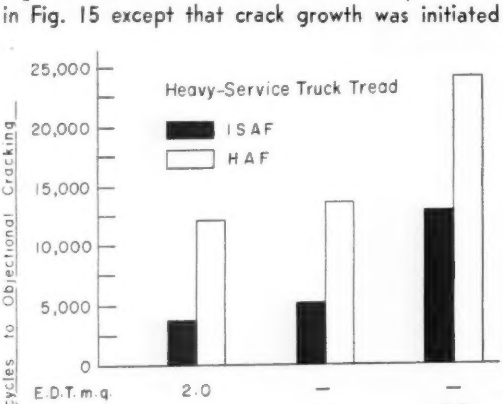


Fig. 17. Outdoor dynamic cracking resistance of protected heavy-service truck tread containing ISAF or HAF carbon black

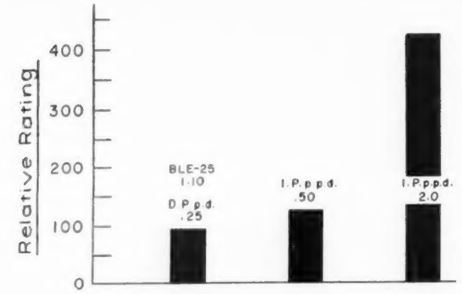


Fig. 18. Groove-cracking resistance of truck tire treads on a multiple-section tire operated in the Los Angeles area

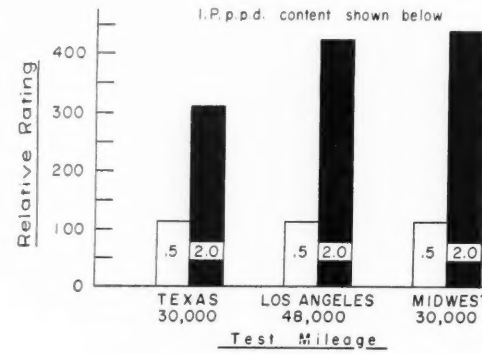


Fig. 19. Comparison of groove-cracking resistance results obtained in three different areas of the country on multiple-section tires. The control (not shown) contained B-L-E-25-D.p.p.d. protection and was rated 100. The other sections of the tire were rated in relation to this control. The figures in the bars indicate I.P.p.p.d. content of the compound used in the section

truck tire tests. The road tests were conducted at Los Angeles, Texas, and in the Midwest on 10.00-20/10/12 size tires. All of the tires were mounted on commercial truck trailers and were run under normal service conditions.

Results (shown in Figures 18 and 19) are expressed in terms of relative rating in groove-cracking resistance. The rating may be defined as the percent of circumference cracked multiplied by the average depth in tenths of an inch of underskid.

Figure 18 shows the relative rating in groove-cracking resistance produced by I.P.p.p.d. in 10.00-20/10/12 nylon tires tested in the Los Angeles area. At the 0.50-part level I.P.p.p.d. exerted a stronger effect than did the control chemical combination of B-L-E-25-D.p.p.d. At the 2.0-part level I.P.p.p.d. produced a 440% improvement in groove-cracking resistance after 48,000 miles of road test.

Figure 19 presents a summary of the road test data

obtained with I.P.p.p.d. in 10.00-20/10/12 size tires at Los Angeles, Texas, and in the Midwest. The results are expressed in terms of relative rating in groove-cracking resistance. In all cases the standard B-L-E-25-D.p.p.d. combination is rated at the 100% level.

The data of Figure 19 demonstrate that I.P.p.p.d. produces a major improvement in the groove-cracking resistance of these nylon tires. The compounds containing I.P.p.p.d. showed significantly less groove cracking at all stages of testing.

Moreover, the road tests above and additional tests not reported here show the protection against groove cracking of I.P.p.p.d. was greater during operation of the tire up to 35,000 miles than in the tire's later life.

Subsequently, additional road tests were run, generally at the I.P.p.p.d. level of 1.5 p.h.r. A total of 194 heavy-duty 10.00-20/10/12 tires has now been tested. No antioxidant was used in any of these tire tests in addition to the I.P.p.p.d. Laboratory data have shown that I.P.p.p.d. produces adequate resistance to both oxidative and thermal degradation of natural rubber truck treads. These tests tend to confirm the laboratory indications.

An independent tire test was made by a second tire manufacturer which showed that I.P.p.p.d. reduces groove cracking in nylon tires. A photographic comparison is shown in Figure 20 comparing tires run for 24,912 miles during the past summer in south Texas. The tread containing 2.0 parts of I.P.p.p.d. shows only slight cracking; while the control without antiozonant is badly cracked in the tread grooves.

I.P.p.p.d. has now been used in full-scale nylon truck tire production for upwards of one year by a major tire manufacturer. Thousands of nylon truck tires have been manufactured using I.P.p.p.d. as inhibitor of groove cracking.

Fig. 20. Result of test for groove cracking by independent tire manufacturer. Section at left is control, and section at right contained 2.0 parts of I.P.p.p.d.

Summary and Conclusions

1. Nylon truck tires containing 2.0 parts I.P.p.p.d. per hundred parts of rubber showed a 440% improvement in groove-cracking resistance at Los Angeles. Similar results were obtained in truck tire tests at Texas and in the Midwest. It is concluded, therefore, that I.P.p.p.d., *per se*, reduces groove cracking in natural rubber truck treads. The magnitude of this improvement is proportional to the amount of I.P.p.p.d. used within the range 0.5-2.0 parts. The advantages imparted by I.P.p.p.d. are particularly noted at mileages up to 50,000.

2. Laboratory hot flexing tests show conclusively that I.P.p.p.d. is in a class by itself as inhibitor of groove cracking and flex cracking in truck tires. As far as the results reported in this paper are concerned, none of the other chemicals tested can be considered to perform this unique function as well as I.P.p.p.d.

3. It is concluded that I.P.p.p.d. significantly inhibits ozone cracking of passenger tires in the Los Angeles area. The tire data reported here show that I.P.p.p.d. produced 25-50% greater inhibition of ozone checking in Los Angeles, both on the weathering wheel and on vehicles, than either E.D.T.m.q. or $(EMP)_2$p.p.d. The applicability of these results to other areas of the country is confirmed by the weathering-wheel test made at Naugatuck, Conn., in which similar ratings of antiozonant effectiveness were obtained.

4. I.P.p.p.d. is effective as an antiozonant in both *Hevea* tread and sidewall, natural rubber-SBR blended sidewalls, and in SBR tread and sidewall compounds. Tests on oven aged tires show that I.P.p.p.d. retains most, if not all, of its protective power after aging.

5. P.C.p.p.d. is effective as an antiozonant for SBR tread and sidewall compounds and is somewhat less powerful than I.P.p.p.d. P.C.p.p.d., however, produces greater inhibition of ozone checking in SBR sidewalls than either E.D.T.m.q. or $(EMP)_2$p.p.d.

6. The chemical $(D.p.p.d.)_n$ was evaluated in laboratory tests only and not in tires. The results of these laboratory tests show that $(D.p.p.d.)_n$ is a less powerful antiozonant than either I.P.p.p.d. or P.C.p.p.d.

7. It is concluded that the accelerated weathering-wheel test correlates well with actual road tests in the Los Angeles area. Comparative antiozonant performance in tires can be predicted by running accelerated wheel tests on multiple-section tires.

Acknowledgment

We acknowledge the assistance and advice of N. P. Bekema, A. W. Bull, R. L. Moore, T. H. Newby, A. P. Paulk, and W. F. Tuley in preparing this report. We also wish to thank S. Smith Griswold, J. R. Taylor, and Paul Grimes of the Air Pollution Control District, County of Los Angeles, for providing the oxidant data.

MEETINGS and REPORTS

Washington IRC Best Ever; Attendance Breaks Record

The 1959 International Rubber Conference held in Washington, D. C., at the Shoreham and Sheraton-Park hotels, November 8-13, was undoubtedly the best and biggest conference of its kind ever held. This Conference was sponsored by the Division of Rubber Chemistry of the American Chemical Society, Committee D-11 on Rubber & Rubber-Like Materials of the American Society for Testing Materials, and the Rubber & Plastics Division of the American Society of Mechanical Engineers, and plans for the event were made as early as 1956.

Because of the nature of the sponsorship of the Conference, the program included papers on rubber chemistry and technology, the testing of rubber and rubber products, and the engineering aspects of equipment and processes and rubber as an engineering material.

There was a record attendance of 1,562 at the Washington Conference, of whom 133 were ladies. Registrants from outside the United States numbered somewhat more than 100 from 20 different countries. A list of registrants from abroad and Canada will be found at the end of this report.

It is difficult to attribute the outstanding success of the Conference to any special factor or combination of factors. Certainly the 72 papers on 16 different subjects presented at 12 technical sessions contributed much new information to the literature on rubber science and engineering. The welcoming address and introduction to the Conference by Wallace R. Brode, Science Adviser to the Secretary of State, United States Department of State, and the IRC banquet address by U. S. Defense Department Deputy Director for Research & Engineering, Howard A. Wilcox, were special features of the meeting. The Goodyear Medal Address by Fernley H. Banbury and the Goodyear Award ceremonies of the Rubber Division, ACS, were other highlights of the Conference.

Another special feature was the exhibits of testing equipment, processing equipment, and raw materials in the main ballroom of the Shoreham Hotel. Twenty-two exhibitors occupied 31 booths, and the exhibits attracted a large number of the registrants at the Conference.

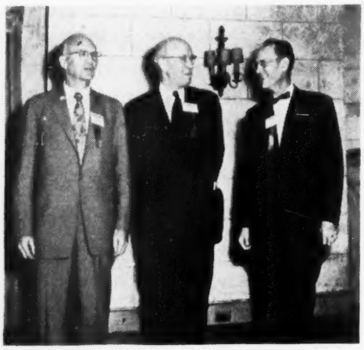
All of the papers given at the Conference and the opening address by Dr. Brode were published in a volume of more than 600 pages by the staff of the Applied Publications of the American Chemical Society. Each registrant received one copy of these "Proceedings —International Rubber Conference— Washington, D. C., November, 1959," and additional copies were sold during the Conference at $10 each. A number of copies will be available for sale in the future at a price and place to be decided by the IRC committee by the end of 1959.

No technical sessions were held on Tuesday afternoon, November 10. A tour of the National Bureau of Standards and a second tour to the Bureau of Engraving & Printing, the Federal Bureau of Investigation, and the National Archives were arranged for that afternoon.

On the social side, the IRC banquet held in the Sheraton Hall of the Sheraton Park Hotel on Thursday evening, November 12, and preceded by a mammoth cocktail party, courtesy of the suppliers to the rubber industry, in the Exhibition Hall of the same hotel were gala events. The luncheon-meeting of the 25-Year-Club of the Rubber Division, ACS, took place in the Shoreham Hotel at Wednesday noon, November 11, and many foreign visitors attended this affair at the invitation of the Club. Several less formal dinners and receptions were arranged also during the week by suppliers to the industry.

A special program of activities for the ladies included bus tours of the city of Washington, an Embassy tour, and a tour of the White House, as well as a luncheon and style show.

Much of the credit for the success of the Conference must go to the administrative committee headed by A. E. Juve, B. F. Goodrich Co.; the program committee under the chairmanship of B. S. Garvey, Jr., Pennsalt Chemicals Corp.; and the local committee on arrangements, of which A. W. Sloan, Atlantic Research Corp., was chairman. It is not possible to list the names of the many persons from the three sponsoring societies that made up these committees and worked so hard for so long to insure the success of the Conference, but their efforts will be remembered by the registrants for some time to come. Of equal or even greater importance were the efforts of the authors of the papers presented, without which there would have been no Conference.



Conference committee chairmen, *left to right:* A. W. Sloan, local committee on arrangements; A. E. Juve, administrative committee; and B. S. Garvey, Jr., program

Technical Sessions

A wealth of new scientific and engineering material was presented in the 12 technical sessions of the Conference held Monday through Friday, November 9-13. There were papers on tires at several of the early sessions, and on advances in test methods at several other sessions. Among the many other subjects on which papers were presented were equipment and processes in rubber manufacturing, natural rubber and latex, synthetic rubber latex, rubber theory, polymers and polymer structure, and vulcanization.

Wallace R. Brode, Science Adviser to the Secretary of State, U. S. Department of State, gave the welcoming address and introduction to the Conference at the first session on Monday morning, November 9. The title of his address was "International Implications of the Development of Science and Technology."

Dr. Brode welcomed the delegates on behalf of the scientists and engineers of this country and the sponsoring societies of the Conference and our Department of State. He mentioned that our scientific progress is expanding at an exponential rate and then named the several agencies of the federal government concerned with science and the

problem of coordinating their efforts. In this country there has been created the President's Science Advisory Committee and a Federal Council for Science & Technology, both of which are headed by the President's Special Assistant for Science & Technology.

There are many international organizations in science in which there is official adherence by the governments of separate countries, but the majority of international science organizations do not have governmental sponsorship.

Wallace R. Brode, U. S. State Department, opening the Conference

Some of the Russian delegation *(seated)* and their American hosts: *left to right (seated):* V. Novikov, M. Akhmedov, B. Dolgoplosk, V. Evstratov, N. Karapetyan, and M. Shumaev (Russian Embassy, Washington, D. C.); *left to right (standing):* Ivan Popoff, Pennsalt Chemicals Corp.; Mrs. John J. Egan, ladies activities committee; Leon Talalay, Sponge Rubber Products Division, B. F. Goodrich Co.

Dr. Brode felt that a non-governmental status should have an advantage in the avoidance of political complexities and would permit many combinations of workers and areas which might find it difficult to get together on a governmental level.

A report has been prepared by the Stanford Research Institute for our Senate Foreign Relations Committee and considers what international problems are created by scientific discoveries. The report considered the problems of raw material supply, substitutes and synthetics, and the changes in demand due to new industries and utilization. Rubber was one of the prime examples of raw materials covered. The opinion was expressed that although much progress has been made with synthetic rubbers, the future for natural rubber was not so uncertain as for certain other natural products for which synthetic replacements have been developed.

The role of flexible plastics and elastomers is a permanent one of increasing importance in our civilization, but the raw material and its sources may certainly vary as scientific, economic, and political developments create the need of a change, it was said.

The impact that science creates in commerce, foreign trade, and economy may well be illustrated in the expanding and developing rubber programs, Dr. Brode said in conclusion. The papers presented at the Conference will serve to emphasize the international character of the field of rubber technology and should improve our scientific viewpoint in our national and international relations, he added.

Among the papers on tires were those relating the design and materials of construction and the effect of forces which act on a tire to develop stresses in the various areas. Other papers explained means of measuring rolling resistance and constructional features contributing to this power loss. Several other papers described tire testing methods and the results of extensive road tests of tires. The role of hysteresis in tire wear and a theory of rubber abrasion were also explained.

A new continuous mixer, an automatic mill, and basic equipment for producing urethane foams were detailed in other papers.

There were two papers on microhardness testing, one on stress-strain behavior of elastomers at different velocities of deformation, several on aging and weathering methods, and two on statistical methods.

In the field of natural rubber and latex there were several informative papers on recent developments in present-day production and processing methods as well as some new information on latex testing.

There were theoretical papers on volume swell, tearing, viscosity, dynamic properties, and statistical considerations underlying molecular theories of rubber elasticity. Included also were several papers on elastomer reinforcement, polymers and polymer structure, and vulcanization.

Non-discoloring oils for processing and extending rubber and latex masterbatching of synthetic rubber, with some comments on future possibilities, were covered in two other papers.

Goodyear Medal Address

The Goodyear Medal address by Fernley H. Banbury was given at the conclusion of Technical Session No. 5 on the morning of November 11. Dr. Banbury first expressed his appreciation for receiving the Charles Goodyear Medal award, which had coupled his name with that of the patriarch of the rubber industry and placed him in the distinguished company of former Goodyear medalists that included many good friends—S. M. Cadwell, R. P. Dinsmore, H. L. Fisher, W. C. Geer, David Spence, and others.

Speaking on "People and the Banbury Mixer," the Medalist first related his experiences in 1916 with H. F. Wanning and his son, F. D. Wanning, of the Birmingham Iron Foundry of Derby, Conn., with whom he signed an agreement for the manufacture and sale of his internal mixer. It was F. D. Wanning who suggested that the machine be called the Banbury Enclosed Rubber Mixer.

Among the items decided upon at the very beginning was that the new enclosed mixer should be able to mix stiff rubber compounds, and that it would therefore have to be a strong machine that would operate day and night, month after month, and year after year without being often shut down for repairs due to breakage. It was also agreed that it must be sold on the basis of proven performance.

Early in the Fall of 1916, William State, at that time chief engineer of the Goodyear Tire & Rubber Co., visited Dr. Banbury at the Birmingham Iron Foundry and, after looking at the drawings of the proposed new mixer and viewing some of the main parts, ordered a railroad car to be on the siding at the B.I.F. plant three days later to take

delivery on the first Banbury mixer. By working day and night the mixer was finished in time, and then after it had been installed in the Goodyear Akron plant, Dr. Banbury went to Akron and worked with Goodyear personnel to demonstrate the mixing and actual running of the machine. Mr. State arranged for the Medalist to receive a copy of all data accumulated, also comments regarding the quality of stock mixed, and how the stock behaved in subsequent tubing and calendering operations. This information could be used in subsequent contacts with other companies as long as Goodyear was not quoted directly and no Goodyear formula was revealed, by virtue of an agreement made at the outset with Mr. State.

Goodyear paid all the expenses of these tests and production runs because the company felt that it and the rubber industry in general very much needed an enclosed rubber mixer, and since the Banbury looked like the machine for the job, Goodyear felt it could afford to help start this mixer on its commercial future, Dr. Banbury explained.

Eventually the tests and the experimental production runs came to an end, and Goodyear ordered 12 Size 3 Banbury mixers. It was explained that the mixer used in the Goodyear tests seemed to give an output per hour about equal to three 60-inch two-roll mills; thus the first mixer was called Size 3. The next larger size was about three times larger and was called Size 9, and the Size 27 is three times larger than Size 9.

Early in 1917, William O'Neil, president of The General Tire & Rubber Co., asked Dr. Banbury to call on him, and after querying the Medalist about his industrial experience and schooling asked that General Tire receive the first mixer available after Goodyear obtained all it wanted at that time. Many Banbury mixers were delivered to General Tire over the years, it was said.

Dick Griffith, general manager of Miller Rubber Co., bought the first Size 27 Banbury mixer in 1921 after experience with the Size 3 and 9 mixers. This was during the 1921 depression when B.I.F. was debating the wisdom of assuming the financial and moral obligation of making such a big mixer at that time. The confidence of Dick Griffith in the Size 27 Banbury was justified, and another one was ordered very soon thereafter.

Some difficulty was experienced with the first Banbury mixer installations at the Firestone Tire & Rubber Co., since the Size 3 was found to be too small and the Size 27 too big for Firestone operations in the mid-1920's when they were purchased. The Size 11 was found to be more suitable, and 13 of these were ordered in 1929. The late Harvey S. Firestone, Sr., was personally interested in the Banbury mixer and expressed his appreciation to the Medalist on more than one occasion.

Dr. Banbury gave the late Ed Anderson, president of Naugatuck's Rubber Reclaiming Co., credit for recognizing the advantages of the Banbury mixer for use with reclaimed rubber and, what is of even greater importance, its use for devulcanizing scrap rubber.

It was B. G. Work, president of The B. F. Goodrich Co., who in the mid-1920's urged expansion of B.I.F. or amalgamation with some other company in order to be better equipped to serve the growing rubber industry. In August, 1927, B.I.F. did amalgamate with Farrel Foundry & Machine Co. to become the Farrel-Birmingham Co., which has continued the further development and manufacture of the Banbury.

Dr. Banbury emphasized that one of the interesting things about the Banbury mixer, its introduction and growth, was that which farsighted, important men in the rubber industry did to help build it up—top financial men, presidents, chemists, engineers, factory manager, and so on. These friends were first in this country and later around the world, wherever rubber factories are located, he added.

Rubber Division, ACS, 25-Year-Club

The twenty-third luncheon-meeting of the 25-Year Club of the ACS Rubber Division was held at the Shoreham Hotel on Wednesday, November 11, with 200 members and guests from abroad present. C. A. Bartle, Du Pont, chairman for this meeting, first extended a welcome to the visitors from abroad and to the regular members of the Club. He then asked the special overseas guests to stand and identify themselves so that they might be better known to their American hosts.

A moment of silent tribute was paid to Club members T. Cowen, A. A. Somerville, and S. R. Doner, who died since the Club's last meeting.

The several new members of the Club, that is, those who were attending the meeting for the first time by virtue of their having completed 25 years in the rubber industry, were next asked to stand and identify themselves. The chairman reminded the new members that they could obtain 25-Year-Club pins by writing Owen J. Brown, Jr., Godfrey L. Cabot, Inc., 125 High Street, Boston 10, Mass., since this company has been providing such pins to Club members as a courtesy for several years.

Mr. Bartle reminded those present that the new listing of members made available to them at this meeting had been supplied as a courtesy by C. M. Baldwin, United Carbon Co.

A special expression of appreciation on behalf of the members was extended by the chairman to H. A. Winkelmann, Dryden Rubber Division, Sheller Mfg. Corp., and E. B. Busenberg, Goodrich, who act as the permanent steering committee for the 25-Year Club.

It was also announced that the cocktails at the reception preceding the luncheon meeting were supplied in this instance by the committee of suppliers who arrange for the larger reception preceding the Rubber Division banquets.

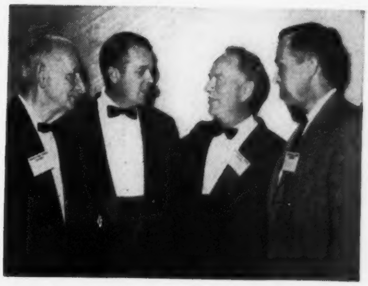
The meeting was turned over to Dr. Winkelmann, who conducted the elimination contest to determine the member or overseas guest with the longest record of service in the rubber industry and who had not been so honored previously. Irving Laurie, Laurie Rubber Reclaiming Co., with 49 years of service, was the winner of this contest and received the usual memento.

C. H. Peterson, U. S. Rubber Reclaiming Co., will be the chairman for the next meeting of the Club to be held at the time of the Rubber Division meeting in Buffalo, N. Y., May, 1960, and John M. Ball, Midwest Rubber

A scene from the Rubber Division, ACS, 25-Year Club luncheon-meeting

I. Laurie, Laurie Rubber Reclaiming Co., *(left)*, receiving memento for 49 years' service in the rubber industry, from H. A. Winkelmann, Dryden Rubber Division, Sheller Mfg. Corp.

W. B. Wiegand, 1960 Goodyear Medalist



Rubber Division, ACS, officers for 1960, *left to right:* R. H. Gerke, United States Rubber Co., secretary; G. E. Popp, Phillips Chemical Co., treasurer; W. J. Sparks, Esso Research & Engineering Co., chairman; W. S. Coe, Naugatuck Chemical, U. S. Rubber, vice chairman

Reclaiming Co., will preside at the meeting to be held in New York in September, 1960.

Rubber Division, ACS, Business Meeting

The regular business meeting of the ACS Rubber Division was held at 11:00 a.m., November 11, with Division Chairman E. H. Krismann presiding and assisted by R. H. Gerke, secretary.

A moment of silence was observed in memory of J. T. Cox, Jr., K. E. Kress, and A. A. Somerville, members whose deaths occurred since the last meeting.

It was announced that W. B. Wiegand, director and research consultant, Columbian Carbon Co., had been selected as recipient of the Charles Goodyear Medal for 1960, in recognition of his outstanding work on carbon black over the last three decades. This award will be made at the next scheduled meeting of the Division to be held in Buffalo, N. Y., May 3-6, 1960.

Mr. Wiegand's industrial career began with Dominion Rubber Co., Ltd.. in Montreal, P.Q., Canada, where he was technical superintendent from 1915 to 1918; he was until 1923 general manager of Ames, Holden, McCready Co., manufacturer of rubber and other footwear. When this latter company went into the tire business in Kitchener, Ont., Wiegand moved to Kitchener as managing director of the Ames Holden Tire Co. Since 1925 he has been with Columbian Carbon and its affiliates, first as director of research for Binney & Smith Co. (1925-36); then he held a similar position for Columbian Carbon, as vice president of the same company (1948-51); and since 1951 has been research consultant and a director.

Mr. Wiegand became a Fellow of the Canadian Institute of Chemistry in 1920. In 1923 he was chairman of the ACS Rubber Division. He joined the Institution of the Rubber Industry of England in 1923 and became a Fellow of it in 1925. In 1957 he was awarded the Colwyn Medal of the IRI at the joint meeting of the Rubber Division, CIC, and the Rubber Division, ACS, held in Montreal in May of that year.

The results of the election of officers and directors of the Rubber Division, ACS, were announced by C. V. Lundberg, Bell Telephone Laboratories, chairman of the tellers' committee. The 1960 chairman will be W. J. Sparks, Esso Research & Engineering Co.; the vice chairman, W. S. Coe, Naugatuck Chemical Division, United States Rubber Co.; the secretary, R. H. Gerke, U. S. Rubber; and the treasurer, G. E. Popp, Phillips Chemical Co. Directors and alternates from areas served by local rubber groups will be as follows: *Northern California*, N. R. Legge, Shell Development Co., with W. H. Dies, Merck & Co., Marine Magnesium Division, as alternate; *Connecticut*, R. T. Zimmerman, R. T. Vanderbilt Co., with H. Gordon, Bond Rubber Co., as alternate; *Detroit*, R. H. Snyder, U. S. Rubber, with W. D. Wilson, R. T. Vanderbilt, as alternate; *Southern Ohio*, D. A. Meyer, Dayton Rubber Co., with H. E. Schweller, Inland Mfg. Division, General Motors Corp., as alternate; *Philadelphia*, R. A. Garrett, Armstrong Cork Co., with J. R. Mills, Goodall Rubber Co., as alternate; *Rhode Island*, R. W. Szulik, Acushnet Process Co., with J. M. Vitale, Crescent Co., Inc., as alternate; *Southern Rubber Group*, J. M. Bolt, Naugatuck Chemical, with M. Mirsky, Guiberson Corp., as alternate; *Washington, D. C.*, A. T. McPherson, National Bureau of Standards, with P. S. Forsyth, Defense Department as alternate. Delegate-at-large will be L. M. Baker, General Tire & Rubber.

The Best Paper Award for the Los Angeles, May, 1959, meeting was made by Chairman Krismann to J. O. Harris, Monsanto Chemical Co., who accepted certificates for himself and co-authors H. W. Kilbourne, G. R. Wilder, and J. E. Van Verth. This paper was entitled "Chemical Inhibition of Ozone Degradation of SBR."

By-law changes for the purpose of electing one-third of the directors each year for a three-year term for better continuity instead of one-half of the directors for a two-year term and to simplify the election procedure were read by Dr. Gerke. A motion was made, seconded, and approved to accept these changes in the by-laws.

A certificate of appreciation was presented to the retiring Division chairman, Mr. Krismann, by the 1960 chairman, Dr. Sparks, at the conclusion of the business meeting.

IRC Banquet

The International Rubber Conference banquet was held on the evening of November 12 in the Sheraton Park Hotel; about 700 members and guests of the Conference were present for the program, which featured the presentation of the Charles Goodyear Medal for 1959 to Fernley H. Banbury, and an address by Howard A. Wilcox, Deputy Director, Research & Engineering, U. S. Department of Defense.

The banquet was preceded by the cocktail party arranged by the suppliers to the industry, which was held in the Exhibit Hall of the Sheraton Park, and at which the technical aspects of the Conference could be put aside for the moment and old acquaintances renewed and new ones made with those from at home and abroad.

Conference General Chairman A. E. Juve presided at the banquet and first extended a special welcome to the overseas guests and those from neighboring Canada. He expressed his gratitude to the Institution of the Rubber Industry of England for its willingness to postpone the Fourth International Rubber

Head table at IRC banquet, Sheraton-Park Hotel, Washington, November 12: *left to right:* R. D. Stiehler, National Bureau of Standards, IRC committee; H. G. Bimmerman, Du Pont, IRC committee; H. Geldorf, Rubber Research Institute T.N.O., Holland; R. H. Gerke, U. S. Rubber, Rubber Division, ACS, secretary; J. LeBras, Institut Français du Caoutchouc, France; J. J. Allen, Firestone Tire & Rubber Co., IRC committee; J. M. Buist, Imperial Chemical Industries, Ltd., England, who spoke for all foreign registrants; R. E. Hess, American Society for Testing Materials; A. W. Sloan, Atlantic Research Corp., IRC committee; Ross R. Ormsby, Rubber Manufacturers Association president; E. H. Krismann, Du Pont, 1959 Rubber Division, ACS, chairman; Howard A. Wilcox, Deputy Director, U. S. Department of Defense and banquet speaker; A. E. Juve, Goodrich, IRC committee chairman

Technology Conference of that organization, which had been planned for 1959 in London, in order that this Conference might be held in the United States. A special request for comments from overseas guests on the Washington Conference was made.

Those at the head table, which included representatives from the three sponsoring societies and their Divisions, and from several of the foreign countries were introduced to the audience by Mr. Juve.

J. M. Buist, Imperial Chemical Industries, Ltd., speaking for all foreign visitors, expressed appreciation for the hospitality extended to them and gratitude for the openness of American technologists in discussing rubber processing and compounding at the meeting. He said he considered the scientific contributions of the Conference "immense" and that it was the "best International Rubber Conference ever held."

S. D. Sutton, Veedip, Ltd., speaking for the IRI, brought greetings from Sir John Dean, president, and George Martin, chairman of the Council of that organization. He mentioned the IRI rubber technologists' diploma which has become very important in maintaining a high standard of performance of such technologists abroad and suggested its adoption in the United States. He added the meetings of the IRI and its local sections were devoting a significant amount of attention to talks on management problems and quality control methods. The IRI will hold its Fourth International Rubber Technology Conference in London in May, 1962, and an invitation was extended to United States technologists not only to attend this Conference, but more particularly to contribute papers to its program.

Dr. G. Fromandi, Farbenfabriken Bayer, AG, said he brought greetings from the Deutsche Kautschuk-Gesellschaft and reported that the German Rubber Society was holding an International Rubber Conference in West Berlin, October 4-7, 1960, and that technologists from all over the world were invited to attend and contribute papers. This Conference will include an exhibition of processing and testing equipment for rubber and of modern synthetic fibers.

Chairman Juve paid special tribute to the local committee on arrangements headed by A. W. Sloan, Atlantic Research Corp., for its fine work in handling the many details of the actual meeting, and to the administrative committee and the program committee, the latter headed by B. S. Garvey, Jr., Pennsalt Chemicals Corp., for the great amount of effort involved in planning and programming the Conference over the past three or more years.

The speaker of the evening, Howard A. Wilcox, U. S. Defense Department Deputy Director for Research and Development, was introduced by Mr. Krismann. Dr. Wilcox, a nuclear physicist of world renown, has devoted

L. M. Jamnadas, Cosmos India Rubber Works Ltd., India

the greater part of his professional life to national defense problems. His address was entitled "Future Prospects."

We are all very much interested in what the future has to bring, Dr. Wilcox said, but we know of no method of making reliable and detailed predictions with regard to the future except perhaps in relation to some aspects of inanimate nature. Today's period of rapid change is both technological and social, and the primary cause of social innovation seems to be pressures of age-old human desires as released by and redirected through a variety of technological advances, Wilcox said.

After citing some examples of how technological advances had triggered social changes in the recent past, Dr. Wilcox discussed some of the technological possibilities which might be realized in the next 100 years. Most fundamentally, he said, is the possibility that man can have under his control an unlimited quantity of energy. The heavy isotopes of hydrogen in the ocean waters, although present in small amounts, might be separated and caused to undergo a thermonuclear reaction to provide more energy in a single powerhouse in a year than is used now annually by the entire world.

The speaker visualized fast personal transportation in vehicles that float above the land or sea on a cushion of air and which could be guided automatically by invisible radar beacons and which would enable men to travel more freely throughout the world and perhaps overcome some of their prejudices and mental restrictions by closer contact with more people.

Also discussed were the possibilities of greater food production, medicines to control population and human growth, and electronic machines to control our actions and thoughts, and even the selection and creation of various species of man and various new human capabilities, both mental and physical.

Dr. Wilcox turned next to impossibilities. First, he said he did not think

F. H. Banbury, 1959 Goodyear Medalist of Rubber Division, ACS, receiving certificate of award from 1959 Division Chairman E. H. Krismann, Du Pont, *left*. R. F. Dunbrook, Firestone, 1958 Division chairman, *center*, had presented the Medalist to Mr. Krismann

man would ever inhabit a satellite in a stellar system other than his native solar system. Also, complete suppression of all non-conformist viewpoints among men is a technological impossibility as is a 100% effective military defense of large targets such as the USA or the USSR against a determined enemy armed with modern weapons.

Dr. Wilcox felt that effective means can and probably will be worked out for policing out of existence the modern weapons of international warfare, and added that he believes free, open, democratic societies have greater survival power than dictatorships have.

In conclusion, the speaker said he foresaw that man will limit his population level and have everything he desires to satisfy his animal needs, but that in the future his value concepts may be very different from what they are today. Far less optimistic social possibilities also exist if, as the result of a major war, men once again have to struggle to gather or grow at least half enough food to feed themselves. It must be admitted that man has today used up many of the high-grade energy sources available to him which he used to get himself started on the long climb to his present technological and spiritual vantage point.

Goodyear Medal Presentation

E. H. Krismann, Du Pont, chairman of the Rubber Division, ACS, presided over the Goodyear Medal Award ceremonies. He first called upon Harry L. Fisher, a past president of the ACS and past chairman of its Rubber Division, who spoke on the life and achievements of the Medalist, Fernley Hope Banbury.

Dr. Fisher explained that Dr. Banbury was born in Cornwall, England, in 1881 and that early in life he decided on an engineering career. He became an apprentice with a machinery manufacturing company in Plymouth and studied in the evening at the Plymouth Technical School. He studied mine assaying and surveying at Penzance School of Mines and Camborne School of Mines, respectively, later and would have gone to India where he had been offered a fine position in a gold mining company except that he "missed the boat." Prior to his planned departure he had been traveling around the countryside saying goodbye to relatives and friends and arrived home in Cornwall just two hours before the boat was to sail from Southampton 150 miles away. Dr. Fisher commented that if Dr. Banbury had not missed the boat, there would probably never have been a Banbury mixer, possibly an internal mixer, but not by Banbury.

Dr. Banbury came to America in 1922 and attended Purdue University, where he received a B.Sc. degree in electrical engineering in 1908. He worked for the engineering firm of Sargent & Lundy in Chicago, then Dr. Edward G. Acheson, inventor of carborundum, and then Werner & Pfleiderer, manufacturer of machines especially for dough mixing. After resigning his position with the last-mentioned firm he applied for a patent early in 1916 for the Banbury mixer.

He became associated with the Birmingham Iron Foundry in Derby, Conn., in 1916, and in the fall of that year Goodyear Tire & Rubber Co. bought the first Banbury mixer, and soon other rubber companies began using them. In 1927 the Farrel Foundry & Machine Co. of Ansonia, Conn., amalgamated the two companies as the Farrel-Birmingham Co. More than 2,000 Banbury mixers are now in operation in this country and abroad.

The Medalist has received several excellent awards including the Modern Pioneer Award from the National Association of Manufacturers and an honorary fellowship of the Institution of the Rubber Industry of England in recent years, to which is now added the Goodyear Medal of the Rubber Division, ACS, Dr. Fisher pointed out.

In concluding his remarks, Dr. Fisher paid tribute to Dr. Banbury as a square dealer, a wonderful friend, a good speaker, and a real gentleman.

R. F. Dunbrook, Firestone Tire & Rubber Co. and 1958 chairman of the Rubber Division, then presented Dr. Banbury to Mr. Krismann who presented him with the Goodyear scroll, medal, and the $200 honorarium. Dr. Banbury expressed his very great gratitude and appreciation to the Division for the honor of being selected as the 1959 Goodyear Medalist.

IRC Exhibits

A special feature of the International Rubber Conference was an exhibit of testing machines and equipment, processing machinery and equipment, and

Head table at IRC banquet continued: *left to right:* F. H. Banbury, 1959 Goodyear Medalist; H. L. Fisher, consultant, who spoke about the Goodyear Medalist; R. F. Dunbrook, Firestone, 1958 Rubber Division, ACS, chairman; M. N. Clair, ASTM vice president; W. J. Sparks, Esso Research & Engineering Co., 1960 Rubber Division, ACS, chairman; O. B. Schier, II, American Society of Mechanical Engineers, secretary; G. Fromandi, Farbenfabriken Bayer A.G., Germany, who spoke for the German Rubber Society; G. Winterhalter, U. S. State Department interpreter; A. Bogaevski, director, Institute of State Committee on Chemistry, USSR; D. Craig, Goodrich, editor, *Rubber Chemistry and Technology*, S. D. Sutton, Veedip, Ltd., England, who spoke for the Institution of the Rubber Industry; V. Zerbini, Pirelli, S.P.A., Italy; G. E. Popp, Phillips Chemical Co., Rubber Division, ACS, treasurer; S. Collier, retired, IRC committee

Views taken at the Conference Exhibit in the Shoreham Hotel

rubbers and chemicals, which was held in the main ballroom of the Shoreham Hotel. Interest in the exhibits was considerable, and the exhibitors expressed satisfaction with results obtained. Included among the exhibitors were the sponsoring societies of the Conference, that is, the American Chemical Society, the American Society for Testing Materials, and the American Society of Mechanical Engineers.

Other exhibitors at the Conference were as follows: American Instrument Co., Silver Spring, Md.; Custom Scientific Instruments, Inc., Kearney, N. J.; Emerson Apparatus Co., Melrose, Mass.; Enjay Co., Inc., New York, N. Y.; Farrel-Birmingham Co., Inc., Ansonia, Conn.; Firestone Synthetic Rubber & Latex Co., Akron, O.; General Dynamics, Liquid Carbonics Division, Chicago, Ill.; Goodyear Tire & Rubber Co., Akron; Instron Engineering Corp., Canton, Mass.; National Bureau of Standards, Washington, D. C.; Ozone Research & Equipment Co., Phoenix, Ariz.; Palmerton Publishing Co., New York; Phillips Chemical Co., Akron; Reliable Rubber & Plastics Machinery Co., Inc., North Bergen, N. J.; Richardson Scale Co., Clifton, N. J.; Science Sales International, New York; Scott Testers, Inc., Providence, R. I.; Shore Instrument & Mfg. Co., Inc., Jamaica, N. Y.; and Testing Machines, Inc., Mineola, N. Y.

The booths of some of these exhibitors are shown above.

List of Foreign Visitors

We have tried to prepare a list, by countries, of the registrants from outside the United States, with the help of the IRC local committee on arrangements. We hope the names and affiliations have been recorded correctly and that we have not overlooked anyone. We will welcome additions or corrections to this list, if necessary.

AUSTRALIA

William E. Allanson, A. Goninan & Co., Ltd., Broadmeadow, N.S.W.; **Norman E. Hartmann,** Olympic Tyre & Rubber Co., Pty. Ltd., Victoria; **George H. Selby,** Olympic Tyre, Queensland.

BRAZIL

Joao Menezes, Rio de Janeiro.

CANADA

Mark Abbott and **A. Sandig,** both of Courtalds (Canada), Ltd., Montreal; **Gordon R. Aiken,** Canadian Industries, Ltd., McMasterville; **W. R. Axton,** Montreal; **C. F. Beale,** Phillips Electric Co., Ltd., Brockville.

J. Carr, Harold G. Deline, A. D. Dingle, N. S. Grace, C. K. Morbey, G. W. Tarbet, and **R. T. Woodams,** all of Dunlop Research Center, Toronto.

J. T. Black, Thomas L. Davies, Zoltan J. Dorko, Louis P. Gelinas, Ian W. E. Harris, Robert C. Klingender, Harry A. McEachern, Joseph Mitchell, John P. Spehar, E. B. Storey, and **W. Harold Watson,** all of Polymer Corp., Ltd., Sarnia.

Jim M. Campbell, Northern Electric Co., Ltd., Montreal; **E. T. Challacombe,** Du Pont of Canada, Ltd., Montreal; **Rodger G. Davis,** Du Pont, Toronto; **Kenneth E. Doherty,** Dillons Chemical Co., Ltd., Toronto; **Thomas R. Griffith,** National Research Council, Ottawa.

Wilfred L. Grignon and **William J. Hogg,** both of Naugatuck Chemicals, Elmira; **O. R. Huggenberger,** Dominion Rubber Co., Ltd., Montreal; **R. C. Workman,** Dominion Rubber, Kitchener; **Guy A. Johnson,** Rubbermaid (Canada), Ltd., Streetsville; **Lloyd H. Krichew,** Army Development Est., Ottawa; **A. B. Lewis,** British Rubber Co., Ltd., Lachine; **John S. Little,** Canadian Industries, Ltd., Kingston.

Herbert L. Nash, Defense Research Board, Ottawa; **John Ramsay,** Miner Rubber Co., Ltd., Granby; **Desmond G. Seymour,** Cabot Carbon of Canada, Toronto; **Dyle Q. Thomson,** Gutta Percha & Rubber, Ltd., Toronto; **Russell R. Tartaglia,** B. F. Goodrich, Canada, Ltd., Kitchener.

CZECHOSLOVAKIA

Zdenck Bortel, Vzkummy Ustar Gumarenske a Plast. Technologie, Gottwaldov; **Ivan Franta,** Technical University in Prague.

DENMARK

H. Leth Pedersen, Northern Cable & Wire Co., Ltd., Copenhagen.

ENGLAND

Herbert C. Baker, L. Bateman, Ernest G. Cockbain, Robert I. Cunneen, Leonard Mullins, and **Adolf Schallamach,** all of British Rubber Producers Research Association, Garden City; **F. N. Bennett,** H. W. Wallace & Co., Ltd., Croydon; **Cyril A. Brighton,** British Geon, Ltd., Glamorganshire; **Joseph David Brown,** Bridge & Co., Ltd., Rochdale.

J. M. Buist and **Ernest R. Thornley,** both of Imperial Chemical Industries, Ltd., Manchester; **Maldwyn Jones,** Imperial Chemical, Garden City; **Arthur Lambert,** Imperial Chemical, Staffs.; **Ralph B. Clark,** C. & J. Clark, Ltd., Somerset; **David B. Clarke,** Lindsay & Williams, Ltd., Manchester;

George K. Moss, Lindsay & Williams, Cheshire.

John D. Copeman, *Rubber Journal & International Plastics,* London; **Frank H. Cotton,** National College of Rubber Technology, London; **Peter G. Croftwhite,** Shell Chemical Co., Ltd., London; **Max H. Dilke,** Distillers Co., Ltd., Surrey.

Frank H. Edwards, British Admiralty, Sheffield; **Walter H. Edwards,** DMXRD Ministry of Supply, London; **George N. S. Farrand,** Admiralty Materials Laboratory, Poole; **John A. Hardman,** British Industries, Ltd., Staffs.; **Mark M. Heywood,** P. B. Cow & Coy, Ltd., London; **Norman C. H. Humphreys,** Greef & Co., Ltd., Berkshire.

Bernhard Martin, Edward A. Murphy, John L. Newnham, Francis C. J. Poulton, and **Glyn B. Roberts,** all of Dunlop Rubber Co., Ltd., Birmingham; **Harry Willshaw,** Dunlop, London; **Norman M. Mims,** Imperial Wemicor Industries, Harrogate.

A. J. Pickett, *Rubber & Plastics Age,* Kent; **Arthur F. W. Sanders** and **Wm. Edward Stafford,** both of The Rubber Regenerating Co., Ltd., Manchester; **John Richard Scott** and **William C. Wake,** both of Research Association of British Rubber Manufacturers, Shropshire; **Jack A. Stephens,** Ronald Trist & Co., Ltd., Bucks.; **Harold J. Stern,** The Laboratory, London; **Sidney D. Sutton,** Veedip, Ltd., Bucks.; **Clifford M. Thomas,** British Geon, Ltd., Glam.; **Charles Ernest Webb,** Pussyfoot Products, Somerset.

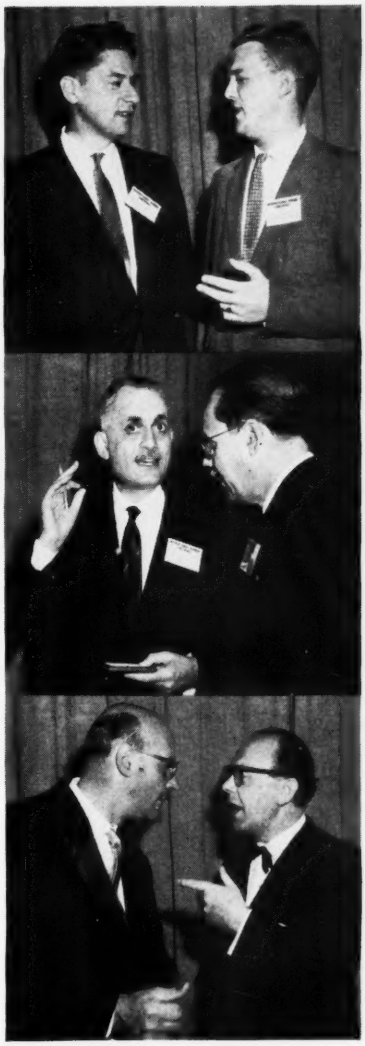
FRANCE

Roger Boussu, Manoir de Beaulieu Chamalieres, Clermont-Ferrand; **George De Laberbis,** Alcan & Co., Paris; **Billy A. L. Dreyfus,** Dunlop Tires, Montlucon; **Marcel Geyer** and **Edouard Grimaud,** both of Société d'Electrochemie d'Ugine, Paris; **Mrs. Gusti Lamm,** Laboratoir du Caoutchouc, Paris; **Jean LeBras,** Institut Français du Caoutchouc, Paris; **Andre Le Fauconnier** and **Jean-Marie Massoubre,** both of Michelin Tire, Clermont-Ferrand; **A. G. Nanoboff,** Ste. Chimique Gerland, Lyon; Mr. & Mrs. **M. J. M. Rideau,** Hutchinson, Nevilly s/-Seine; **Emanuel R. Valtier,** S. A. Dunlop, Paris; **E. S. Voutetakis,** Du Pont, Paris.

GERMANY

Kurt Brautigam, Dortmund Aplerbelk, Dortmund; **Ruprecht Ecker, Adolf Fredrich, G. Fromandi, Friedrich Lober, Siegmund S. Reissinger,** and **Paul Schneider,** all of Farbenfabriken Bayer AG, Leverkusen.

Wilhelm W. Hofferberth, Deutsche Dunlop Gummi Co., AG, Hanau/-Main; **H. Junghanns** and **Ch. Schmidt,** both of Farbwerke Hoechst AG, Frankfurt/Main-Hoechst; **Walter Kern,** Metzeler Gummiwerke, Munchen; **Willy Kraemer,** Deutsche Dunlop Gummi Co., AG Hanau/Main; **Curt P. Oettner,** Leverkusen; **Thies Timm,** Diplom-Chemiker, Hamburg-Haiburg.



A few of the delegates from abroad: *left to right, top:* E. C. Ganslandt and H. K. G. Palmgren, both of Trelleborg Gummifabrik, Sweden; *middle,* Oberto Canonici, Pirelli, S.A., and Adolfo Antonioli, E.N.I., Italy; *bottom,* Arnaldo Ghiringhelli and J. W. Gerber, both of Enrique Ghiringhelli, S.A., Uruguay

HOLLAND

O. K. F. Bussemaker and **Klaas Van Waveren,** both of Ketjen Carbon N. V., Amsterdam; **Seel DeMey,** Vredestein, Enschede; **N. Dost,** Shell International Research, Van Bylandtlaan; **Hermanus Geldof,** Rubber Research Institute T. N. O., Delft; **G. J. Van der Bie,** Koninklijke/Shell Plastics Laboratorium, Delft.

INDIA

L. M. Jamnadas, The Cosmos India Rubber Works, Ltd., Bombay.

ITALY

Adolfo Antonioli, E.N.I., Milano; **Oberto Canonici, Silvio S. Eccher,** and **Valentino Zerbini,** all of Pirelli, Milano; **Renato Dadea,** Montecatini Soc. Gen., Milano; **Rolf Fialla,** Columbian Carbon Co., Milan; **Sergio Tomassini,** Farrel-Birmingham Co., Inc., Milan.

JAPAN

T. Arimitsu, Japan Synthetic Rubber Co., Tokyo; **Atsumi Shinohara** and **Takeshi Hagiwar,** both of The Japanese Geon Co., Ltd., Tokyo.

LIBERIA

G. Verhaar, Firestone Plantation, Harbel.

MALAYA

John E. Morris, Rubber Research Institute of Malaya, Kuala Lumpur.

PAKISTAN

E. Ahmed, National Tire & Rubber Co., Karachi.

SWEDEN

Eugen C. Ganslandt and **Hans Palmgren,** both of Trelleborg Gummifabrik, Trelleborg; **Bengt Hammarskiold,** A. Johnson & Co., Malmo.

SWITZERLAND

Jan O. Willums, Phillips Petroleum Co., Kilchberg-Zh.

URUGUAY

J. W. Gerber and **Arnaldo Ghiringhelli,** both of Montevideo.

USSR

M. Akhmedov, Baku Plant, Baku; **Mrs. N. Baranovskja,** Institute of Aviation Materials, Moscow; **Anatoli Bogaevski,** director, **Boris Dolgoplosk,** assistant director, **Vasili Evstratov,** assistant director, all of Institute of State Committee on Chemistry; **Norair Karapetyan,** Ereivan Plant, Ereivan; **Victor Norikov,** Scientific Institute Latex, Moscow; **M. A. Shumaev,** Embassy of the USSR, Washington, D. C.; and **Yuri Vorontsov,** interpreter, Moscow Institute, Moscow.

Textiles, Compounds, and Design of "Today's Tires" at Akron RG

The fall meeting of the Akron Rubber Group took the form of a symposium on "Today's Tires." The meeting was held at the Sheraton Hotel, Akron, O., on October 23, with a suppliers' cocktail party and dinner following the technical session. Speaker after dinner was Dr. R. C. S. Young, of the General Motors speakers bureau, who is on leave of absence from State College of Business Administration, Atlanta, Ga., and who is described by the U. S. Chamber of Commerce as "One of the Ten Most Sought After Speakers in America."

General Tire Photo

New officers of the Akron Rubber Group are *(left to right)* I. J. Sjothun, vice chairman; M. H. Leonard, chairman; C. W. Stalker, treasurer; J. H. Gifford, secretary

Panel members speaking on "Today's Tires" at Akron were *(left to right)* B. Kastein, moderator; T. M. Kersker, on textiles; K. R. Garvick, on compounding; and K. L. Campbell, on design and construction

1959-1960 Officers

This meeting was the first to be conducted by the current officers. As shown in the accompanying photograph, they include M. H. Leonard, chairman, Columbian Carbon Co.; I. J. Sjothun, vice chairman, Firestone Tire & Rubber Co.; C. W. Stalker, treasurer, General Tire & Rubber Co.; and J. H. Gifford, secretary, Witco Chemical Co.

The panel for the symposium included B. Kastein as moderator, Firestone; T. M. Kersker, Goodyear Tire & Rubber Co.; K. R. Garvick, Mansfield Tire & Rubber Co.; and K. L. Campbell, Firestone.

Technical Program

In his introductory remarks Mr. Kastein pointed out that with 13-inch wheels as well as 14- and 15-inch wheels being widely discussed and needing new technology, there are also the tremendous demands being made on off-the-road and truck tires for the tire engineer to consider. The moderator indicated that the program would follow a somewhat normal pattern and begin with a talk on the very basic material, "textiles," then go on to compounding, and finally conclude with design and construction.

The first panelist, Mr. Kersker, discussed the importance of the textile portion of the tire. As he pointed out, the cord in the tire is like a kite string; all of the power must be transmitted through this cord both in accelerating and in braking. The tire fabric is the most costly part of the tire, and more than $400 million worth of tire fabrics will be used in tires this year.

The speaker covered the terminology of the tire fabric engineer including such words as fiber, filament, yarn, cord, denier, and thread. He also went into the method of making up a cord with yarn in that two or more tire yarns are twisted together to form a cord in the textile mill. This twist and number of yarns can alter the properties of the cord and must be balanced among strength, fatigue, and cost to give the best possible cord at the least cost.

Among other characteristics of the cord that the engineer must take into account are tenacity, elongation, growth, heat resistance, moisture resistance, stability, adhesion, and fatigue. The importance of these various properties was individually dealt with. Adhesion particularly was explained in some detail since it is the important link which holds the rubber and fabric together.

It was also suggested that improvements in tires could be made by either better-quality materials or by more quantity of materials. In the first case, the better quality, most of the companies are constantly seeking for improved materials and have adopted the newer improved Tyrex and improved nylon textiles. Improved tires can also be made by controlling quantity. This means that an optimum quantity should be used because too much can be detrimental as well as too little.

In conclusion, Mr. Kersker took a look into the future. Fibers are being improved, and new fibers may be just around the corner. Lower denier rayon is also being tested.

The compounding aspects concerning "Today's Tires" were covered by Mr. Garvick. The first consideration, when discussing compounding, is the basic rubber hydrocarbon, and this was the first point taken. Natural rubber led the list, with SBR, butyl, neoprene, Hypalon, and the SBR oil and black modified rubbers getting their proper rating. Also included was mention of the isoprene rubbers which may eventually replace natural rubber when price and supply problems are licked.

The second class of material in compounding tires is carbon black. Noting that carbon blacks can be made from oil, gas, or a combination of oil and gas, the author listed the various grades rather briefly since a discussion of blacks could be a lengthy project of its own. He did note that ISAF and SAF blacks have particularly come into their own since the introduction of oil-extended rubber and black masterbatch production techniques.

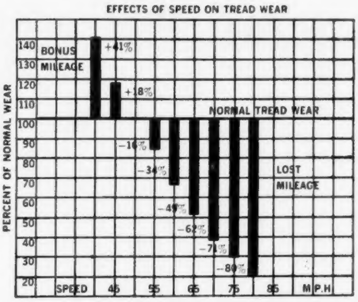
Five basic compounding principles were listed and discussed. These are: (1) reinforcement, (2) processing, (3) cure, (4) special properties, and (5) ozone protection. In addition to these points, of course, the compounder must consider cost. This includes a consideration of the value received per dollar as well as simple lowest-cost material.

The several parts of a tire and some of the particular needs of the compounds designed for these parts were also discussed. Some of the differences between body or carcass stocks for inner and outer plies were mentioned along with information on breaker plies. The tread and sidewall compounds were also given in terms of their particular needs and functions.

Pointing out that modern high-speed driving puts considerable extra strain on the tire and makes it hard for the compounder to keep adding value into the tire, the author showed a slide (see chart) of the lost mileage when a tire is operated at high speeds. At 80 m.p.h one can expect only 20% of normal wear.

Truck tires and those designed for off-the-road service have some problems of their own. In truck tires low heat build-up, heat resistance, tear resistance, and tread life are some of the most pressing needs. The off-the-road uses are basically the same as for truck tires except that the tread and the sidewall must be especially cut and snag resistant.

After a brief description of some of the indoor laboratory and outdoor tests available to the tire compounder, Mr. Garvick summed up by saying, "I believe that most of you over the last decade will agree that rubber technol-



SPEED *"EATS UP"* TIRE MILEAGE

ogy has really left the art of the past and has become a science."

"Design and Construction" was the title of the final paper of the technical session by Mr. Campbell. He suggested that even with the superb materials described by the two previous speakers, the design engineer feels that trying to meet the needs of every requirement for pneumatic tires is like shooting at a moving target while standing on a pile of banana peels. The best materials in the world do not, of themselves, make a superior product. They must be combined in the proper amount and in the proper places.

The problems handed the tire producer are borne out again by data collected by this speaker. Speed and high horsepower have imposed a large challenge on the tire performance. As an indication of the part speed plays, a survey made at a point in Texas showed that 80% of the cars that passed were traveling at least 70 m.p.h, and an amazing 35% were actually traveling more than 80 m.p.h. Further confirmation of this problem is contained in the information of the accompanying map of the United States showing that the areas where speed is possible and habitual produce the greater number of tire adjustments or, in other words, tire problems.

Automobile design also creates tire design problems. The increase of weight of the front axle has caused front-wheel tires to wear faster than rear-wheel tires and presents added problems in giving good steering and cornering properties to the tires. The adoption of the 13- and 14-inch wheels for the newer and smaller cars has also created some additional problems for the tire designer to give more wear as well as a better ride. The desire for a "soft" ride means designing a balance of properties to try to obtain this feature without degrading the wear quality too much.

Many of the intricacies of tire construction and tread design were covered. These are somewhat different for truck tires, as compared to passenger-car tires, but many of the same considerations apply. Quite a good deal of the paper was devoted to discussion of cord angles, cord constructions, and other construction details such as plies and breaker strips.

Map of United States showing areas of least and most tire adjustments

A final point brought out by the speaker was the important contribution of tire designers in the field of standardization. Through the Tire & Rim Association and the cooperation of the tire manufacturers the consumer is able to put various brands of tires on any other brand of rim or be able to use anyone's matrix for retreading. This standardization caused much sweat and tears during its development in the highly competitive tire industry, but the speaker expressed the belief that it was a major contribution of the tire designer to safety.

Campbell concluded by quoting Charles Kettering, who, in 1955, said, "The pneumatic tire was the basis of the automobile industry. The story of the pneumatic tire is one of the most impressive engineering stories in the world."

Joint Canadian Meeting

The Wellington-Waterloo Section of the Chemical Institute of Canada and the Ontario Rubber Group held a joint meeting at the Kress Hotel, Preston, Ont., Canada, on November 17. About 130 members and guests of the two groups met at the cocktail party, of which Monsanto (Canada) was host, preceding the dinner.

Seated at the head table at the dinner were: R. R. Tartaglia, ORG chairman, B. F. Goodrich Canada, Ltd.; Ken McFee, chairman, W-W Section; Des. G. Seymour, ORG vice chairman, Cabot Carbon of Canada; W. Ross Smith, ORG secretary, Dominion Rubber Co., Ltd.; H. Chipman, secretary, W-W; J. A. MacDonald, chairman, Rubber Division, C.I.C., Canadian Industries, Ltd.; D. D. Stokes, vice president, sales, Monsanto Canada; J. G. Edmiston, sales manager, rubber chemicals, Monsanto Canada; Lloyd V. Lomas, ORG treasurer, St. Lawrence Chemical Co.; J. O. Harris (speaker of the meeting), associate director of research, Monsanto Chemical Co., Nitro, W. Va.; Charles Fletcher, Kitchener representative, ORG, Dominion Rubber; and Dave Hay, member-at-large, ORG, Polymer Corp., Ltd.

It was announced by John MacDonald that the annual one-day convention of the Division of Rubber Chemistry, C.I.C., will be held at the Walper House, Kitchener, Ont., April 8. It will consist of the presentation of papers during the day, followed by the annual banquet that evening.

Mr. Tartaglia announced that the next meeting of the Ontario Group would be the annual Christmas party to be held at the Fischer Hotel, Hamilton, Ont., December 10. Mr. Stokes then introduced the speaker, Dr. Harris.

His subject was "Chemical Inhibition of Ozone Degradation of SBR." This paper was previously presented before the Division of Rubber Chemistry, American Chemical Society, at Los Angeles.[1] In it, the recent research activities in the field of developing chemical antiozonants were discussed. The apparatus used, the comparison standards established, the fixed proportion in a standard formula established, and the standard dynamic test under fixed conditions of ozone concentration were described. Dr. Harris went on to discuss the series of materials tested; then the main part of the paper presented the comparison of antiozonant protection given by the variation of various groups within the molecule of two of the more efficient chemicals. It was clearly demonstrated that certain positions of certain radicals within the molecule were mandatory for optimum protection against ozone attack.

[1] See RUBBER WORLD, Apr., 1959, p. 90.

During the question period following the presentation of the paper it was brought out that most of the better antiozonants were staining materials.

Wray Cline expressed the sincere thanks of everyone present for the most interesting paper, the excellent presentation, and one of the most enjoyable meetings in some time.

Molecular Sieves Talk

The November meeting of the Elastomer & Plastics Group, Northeastern Section, ACS, was held at Science Park, Boston, Mass., November 17, with 60 members and guests present. The technical session featuring a talk on molecular sieves by Jerome E. Schmidt, Linde Co., Division of Union Carbide Chemicals Co., was held after the usual cocktail hour and dinner.

Schmidt described the methods of formation of the sieves and some important features of their manufacture and use. Since moisture will act as a release agent in most cases, he pointed out how a premix of one sieve will tie up the moisture and allow a second chemically loaded sieve to remain heat-releasing.

He described a recently offered chemically loaded sieve, CW9246, with composition not disclosed, for use in retreading tires or other low-temperature cure applications or where one-side heat or thick sections are involved.

Since heat will cause the migration of the chemical from the sieve interior they are particularly useful in rubber and plastic curing where the sieve can take the place of both the activator and the catalyst, or anti-scorch agent and accelerator in certain cases. Among materials studied with these sieves are peroxides, piperidine and dibutyl amine, catechol, dimethylthiourea, morpholine, and HCl.

The sieves were described as useful in rigid vinyls, urethane foams, and epoxy compounds, and predictions were made of their use in drug, reodorant, medicinal, and detergent applications.

Sports Night at CRG

The annual fall meeting of the Connecticut Rubber Group was held November 6 at Rapp's Paradise Inn, Ansonia, Conn., with 150 members and guests present. Two special features of this meeting, which are traditional, were the honoring of the salesmen by making them special guests for the evening and celebration of "Sports Night" as dinner entertainment.

The technical portion of the meeting was taken up by the showing of a film, "The Atom Comes to Town." After this film, came the regular cocktail hour and dinner.

The speaker for the "Sports Night" portion of the program was Arnold "Red" Auerbach, coach of the Boston Celtics basketball team, who substituted for the announced speaker, Bob Cousy, who was unable to be present. Coach Auerbach gave a very interesting talk on his experiences and basketball in general. He spent some time on the athletic feud between Wilt Chamberlain of Philadelphia and the Celtics' "Big Bill" Russell.

He also spoke of his world tour and suggested that, "The people around the world, I feel, actually appreciated the basketballs and shoes that were given them more than the multi-million dollar loans our country makes."

CALENDAR of COMING EVENTS

December 18
New York Rubber Group. Christmas Party. Henry Hudson Hotel, New York, N. Y.
Chicago Rubber Group. Christmas Party. Morrison Hotel, Chicago, Ill.

January 12-15
Society of Plastics Engineers. Sixteenth Annual Technical Conference. Conrad Hilton Hotel, Chicago, Ill.

January 19
Elastomer & Plastics Group, Northeastern Section, ACS. Science Park, Boston, Mass.

January 25-28
Plant Maintenance & Engineering Show. Convention Hall, Philadelphia, Pa.

January 29
Akron Rubber Group. Sheraton Hotel, Akron, O.
Chicago Rubber Group. Furniture Club, Chicago, Ill.

February 1-5
American Society for Testing Materials. Committee Week. Hotel Sherman, Chicago, Ill.

February 2
The Los Angeles Rubber Group, Inc. Biltmore Hotel, Los Angeles, Calif.

February 3-5
Committee D-11, ASTM. Hotel Sherman, Chicago, Ill.

February 5-7
Boston Rubber Group. Ski Week-End.

February 11
Fort Wayne Rubber & Plastics Group. Van Orman Hotel, Fort Wayne, Ind.

February 12-13
Southern Rubber Group. Shamrock Hilton, Houston, Tex.

February 19
Connecticut Rubber Group. Symposium: "Polymers for the '60's." Waverly Inn, Cheshire, Conn.

March 1
The Los Angeles Rubber Group, Inc. Biltmore Hotel, Los Angeles, Calif.

March 11
Chicago Rubber Group. Furniture Club, Chicago, Ill.

March 17
Quebec Rubber & Plastics Group.

March 18
Boston Rubber Group. Hotel Somerset, Boston, Mass.

April 5
The Los Angeles Rubber Group, Inc. Biltmore Hotel, Los Angeles, Calif.

April 8
Rubber Division, CIC. Annual Meeting. Walper House, Kitchener, Ont., Canada.
Akron Rubber Group. Sheraton Hotel, Akron, O.

April 14
Fort Wayne Rubber & Plastics Group.

April 22
Chicago Rubber Group. Furniture Club, Chicago, Ill.

May 3
The Los Angeles Rubber Group, Inc. Biltmore Hotel, Los Angeles, Calif.

May 20
Connecticut Rubber Group.

May 23-26
Design Engineering Show. Coliseum, New York, N. Y.

May 24-27
Division of Rubber Chemistry, ACS. Statler Hotel, Buffalo, N. Y.

June 10-11
Southern Rubber Group. Atlanta, Ga.

June 17
Akron Rubber Group. Outing. Firestone Country Club.
Boston Rubber Group. Outing. Andover Country Club, Andover, Mass.

WASHINGTON REPORT

By JOHN F. KING

"No Contest" Pleas Accepted On Belt Price Fixing Charges

A New York Federal judge in November agreed to accept a plea of "no contest" from The Rubber Manufacturers Association, Inc., and 10 member companies charged in a criminal indictment returned by a grand jury last March 4. The indictment charged illegal price-fixing of flat industrial belting.

Judge Gregory F. Noonan on November 9 rejected the argument of government prosecution attorneys for stiffer penalties and fined RMA and the defendant firms a total of $177,500. Justice Department lawyer David H. Harris wanted the court to refuse the defendants' plea of "nolo contendere"—acceptance of the charges without admitting guilt—and force the case to trial. Failing that, he sought to have Judge Noonan set the fines at $485,000 on grounds a number of the rubber companies were frequent violators of the Sherman Anti-Trust Act and Federal Trade Commission regulations.

In imposing the $177,500 fine over the strenuous objections of the Justice Department representative, Judge Noonan advised the Department to seek the indictment of individuals in such cases as the "best way to enforce the law against chronic violators." The court "can't send a corporation to jail," he said.

The maximum fine that could have been imposed on each of the defendants was $50,000. As set by Judge Noonan, RMA was fined $10,000; The B. F. Goodrich Co., Goodyear Tire & Rubber Co., and United States Rubber Co., $35,000 apiece; H. K. Porter Co., $10,000; New York Rubber Corp., $7,500; American Biltrite Rubber Co., $10,000; Raybestos-Manhattan, Inc., $7,500; Acme-Hamilton Mfg. Corp., $5,000; Lee Rubber & Tire Corp., $15,000 and Hewitt-Robins, Inc., $7,500.

The government's original complaint to the grand jury, repeated in Harris's arguments before Judge Noonan, was that RMA and the defendants "have conspired for the last 10 years to fix and maintain uniform prices, terms and conditions of sale" for the belting they produced. The government said that the firms involved accounted for more than 95% of all flat belting manufactured in this country, and that the current level of sales was about $65 million a year. It added that demand for belting has been "continually increasing."

When the grand jury returned the original indictment on the basis of Justice Department charges, Assistant Attorney General Victor R. Hansen, the government's top trust-buster, said "price fixing on such a product as industrial belting is a serious matter and clearly warrants criminal prosecution." He charged that the alleged "combination and conspiracy" between RMA and the companies has produced a suppression and elimination of competition in the field. He said "purchasers of flat belting have been deprived of a free and competitive market" as a result.

In his presentation before Judge Noonan, government attorney Harris reiterated that the price-fixing "involved the entire industry" and existed between 1949 and 1957. During that period, he said, the defendant companies ran their affairs in an "audacious" manner. To support his charge, he said they jacked up the price of conveyor belting five times during the Korean war year of 1950, "in anticipation of a shortage and government controls." In that single year, he said, the companies "ran the price up 46.5%." Over the life of the alleged conspiracy, from 1949, he said, industrial belting prices were raised 67.5%.

FTC Position on TBA Items May Be Reversed for Rubber Companies

Three major rubber companies whose affiliation with three major oil companies got all six firms in trouble with the Federal Trade Commission in 1956 successfully defended themselves in the first 'trial" of the case by the trade-policing agency.

FTC examiner Earl J. Kolb recommended that the three-year-old charges against The B. F. Goodrich Co., Goodyear Tire & Rubber Co., and Firestone Tire & Rubber Co. be dismissed. At the same time, Kolb urged the Commission to uphold his decision that the Texas Co., Atlantic Refining Co., and Shell Oil Co. unlawfully coerced their dealers to buy tires, batteries, accessories, and supplies from the three rubber companies.

All six industry leaders were cited jointly in the original FTC complaint of 1956. It was charged then that the companies cooperated to coerce gas stations selling Texas, Atlantic, and Shell products to buy TBA items from Goodrich, Goodyear, and Firestone and discontinue buying from other rubber companies.

Kolb ruled in an initial recommended decision which must be upheld by the Commission that there is no evidence that the three rubber companies participated in the alleged coercive practices of the oil companies. He said their payment of 7.5 to 10% commission to the oil firms for "sponsoring" their TBA products with retail gasoline dealers was "based upon substantial services rendered" in promoting the rubber companies' lines of TBA.

In addition to the sales commission agreements between Goodrich-Texas, Goodyear-Atlantic, and Firestone-Shell Kolb said similar contracts were entered into by Texas and Firestone, Shell and Goodyear, and Atlantic and Firestone. These contracts, he continued, required the oil companies, for a commission, to recommend the seller's TBA products to their dealers; hold dealer meetings, and provide training courses in which the "sponsored" TBA item was promoted; participate in the rubber companies' sales promotion programs; and make TBA products available to credit-card holders without carrying charges.

Kolb listed as examples of commis-

sion payments this evidence from 1955: Shell was paid $1.6 million by Firestone and $1.8 million by Goodyear on purchases by Shell distributors of Firestone TBA items valued at $17.5 million and purchases of Goodyear products worth $21.3 million; Texas received $1.6 million from Goodrich and $3.2 million from Firestone on purchases of $17.9 million and $35.5 million, respectively; and Atlantic's commissions from Goodyear and Firestone, respectively, were $558,000 and $506,000 on purchases of $5.7 million and $5.5 million.

The trial examiner said he recognizes that the gas station witnesses—220 provided testimony for the record —"were under considerable pressure because they were naturally interested in not jeopardizing the renewal of their leases." Not all testified to having been coerced or pressured by the oil companies, but the evidence "as a whole, indicates that coercion and pressure were, in fact, brought on a substantial number of dealers to induce them to purchase sponsored TBA and to discontinue the purchase or display of non-sponsored items," he said.

Kolb also took testimony from other TBA suppliers who competed with the three firms cited in the original complaint. These "non-sponsored" firms testified they had difficulty selling to Shell, Atlantic, and Texaco stations.

FTC can sustain Kolb's recommended decision to force the oil companies to discontinue unfair methods of competition which coercion constitutes when it lessens competition; FTC can accept the Kolb recommendation in part or modify it; or it can refuse to take action on the examiner's findings.

Industry Protests Tariff Cuts, Loses Out on "Buy American" Plan

The foreign affairs of the rubber industry have been somewhat in the news in recent weeks. On the one hand, U. S. rubber manufacturers advised the government they will resist any move to reduce American tariffs on rubber products. On the other, rubber industry came close to, but in the final analysis missed out on, a bigger slice of the funds the government spends on the foreign-aid program.

The matter of rubber product tariffs arose in October, when George Flint, secretary of The Rubber Manufacturers Association, Inc., told the interdepartmental Committee for Reciprocity Information that duty reductions for foreign tires and rubber belts would only place foreign manufacturers in a more favorable position to displace domestic sales of American producers. The CRI panel is considering whether to recommend to President Eisenhower tariff cuts on imports of implement tires (non-automotive) and V-belts.

CRI is trying to find where United States tariffs may be reduced in "compensation" for U. S. tariff increases approved earlier this year when imports of spring clothespins, steel safety pins, and clinical thermometers rose to a level where they injured U. S. producers. Under the rules of the General Agreement on Tariffs and Trade (GATT), any member-nation raising duties on a "concession" item, as were clothespins, safety pins, and thermometers, must offer the affected nation "compensatory" tariff cuts on other items. Implement tires and belts were among the items listed as possible "compensation" cuts for Sweden, the United Kingdom, and Japan, the chief sufferers when duties were raised on the three concession items.

Flint told CRI that a number of considerations militate against duty cuts on the listed rubber products. He cited high U. S. wage rates, compared with foreign levels, paid in the rubber industry; the industry's contribution to national defense; and the wide spread between U. S. and foreign prices which in the wheelbarrow tire field "has just about eliminated American manufacturers. . . .

"While we realize that the present impact of foreign-made belts, belting, and tires upon domestic production is not serious, the lowering of the meager protection provided under existing tariff rates could readily lead to an influx of foreign-made articles that could seriously affect the industry," Flint said.

He added that U. S. manufacturers "be allowed to retain their present position in the domestic market, and that the tariff rates on the scheduled items remain unchanged."

On the foreign aid front, rubber manufacturers were hopeful of cashing in on a bigger share of government foreign-aid spending, which in fiscal 1959 saw outlays by the International Cooperation Administration (ICA) of $170 million for chemical and rubber products under various assistance programs. Their interest in the aid program was whetted earlier this fall when the Development Loan Fund (DLF) announced that its foreign-aid lending activities henceforth will be "tied" to the purchase of U. S. goods and services.

DLF's action, prompted by the Treasury Department as a means of staunching the growing and alarming outflow of U. S. gold and dollars to other countries, was nearly paralleled by ICA, also under Treasury pressure, until the signals were switched by Secretary of State Christian A. Herter and his Undersecretary, Douglas Dillon. Herter announced in a New York speech November 16 that a small portion of ICA's $900-million-a-year "offshore" procurement program would be switched to a "Buy-American" basis.

But the amount involved—estimated not to exceed $25 million—would go for project-type assistance (dams, railroads, highways, etc.) and not for "consumable" items such as chemicals and related products. The consumables, which include everything from toothpaste to tires, will continue to be bought by ICA from Free World sources on competitive bidding, Herter said. This policy will continue despite the gold-dollar outflow problem, he indicated.

The struggle between Treasury and State departments over a "buy-it-here" reorientation of foreign-aid procurement policies recalled an earlier episode in the foreign-aid program which saw the rubber industry favored by a deliberate channeling of aid funds to U. S. rubber factories.

This was in 1954 when, as an aftermath of the recession and pressure from rubber and other industries for more foreign-aid procurement orders, Aid Director Harold E. Stassen redirected about $20 million worth of tires and related equipment orders to U. S. producers. The contracts originally had been earmarked for procurement from foreign suppliers.

ICA aides recall that the problems created by this ostensibly simple operation overshadowed the problems it was supposed to solve. They say that the U. S. rubber companies which lost out to other domestic producers on the orders complained about unfair treatment and that intense bickering resulted in which ICA—then called the Foreign Operations Administration—ended up the "culprit." They also recall that some of the successful U. S. bidders were unable to produce the "off-beat" specifications required by the foreign recipients of the products.

There were other annoying problems too, not the least of which was one Secretary Herter referred to in his New York speech:

"A change in U. S. procurement by the ICA," he said, "would in turn force a change from private to government operation in the distribution of our assistance, and so would run directly counter to our endeavor to promote the establishement of free enterprise in the newly developing countries."

Stockpile Sales Begin

The General Services Administration sold off the first batch of the 50,000 tons of stockpiled natural rubber the government will dispose of between now and next June 30. GSA said early in November that the first two weeks

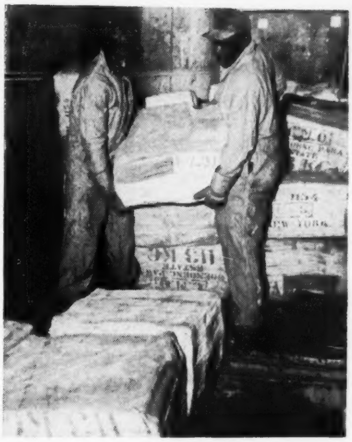
of the sale program—between October 16, when the sell-off began, and October 30—saw 5,796 long tons of stockpiled rubber sold at prevailing market prices.

The sales contracts, arranged by telephone negotiation with GSA sales agents, provide for the delivery from government warehouses as follows: October, 1,683 long tons; November, 1,905 long tons; December, 1,378 long tons; and January, 1960, 830 long tons. According to agency officials, future sales figures will be made available on a regular monthly basis.

GSA advises rubber buyers to contact J. J. Wolfersberger or J. P. McElligott in order to negotiate purchases "on the basis of prevailing market prices and in such a manner as to avoid disruption of the usual rubber market and at the same time protect the United States against avoidable loss." They can be reached at Executive 3-4900, extension 4447, in Washington.

Later, on November 20, GSA advised rubber buyers that 35,000 long tons of top-grade ribbed smoked sheets, plus 4,700 tons of non-specification rubber, would be put up for sale at 2¢ per pound under prevailing market prices. The agency indicated this offering would be part of the 40,000-50,000-ton stockpile total it intends to sell off in lieu of rotation by next June 30.

In advising the trade that it will sell about 35,000 tons of #1X RSS—with "some very small quantities of #1 RSS"—GSA said the rubber had been acquired from the United Kingdom in 1940 under a barter agreement. The other 4,700-ton batch of non-specification, off-grade types will be sold at the 2¢ discount only if individual lots in this category are purchased at one time, GSA explained.



Part of an early shipment of stockpile rubber, from a government warehouse, being unloaded at The B. F. Goodrich Co. plant in Akron, O., after being sold by the GSA

The agency officials said the difference between #1X and #1 RSS is that the former is a premium-grade produced and packed on a single plantation. Standard #1 grade is top-grade, but usually is produced and packed on a number of plantations.

GSA said the 35,000 tons of #1X it is selling has been continuously stored by the government for the past 19 years and is currently located at the Columbus, O., general depot.

Hearings Held On Federal Contract Minimum Wage Rates

Labor Secretary James P. Mitchell in November reviewed the exceptions and other comments of rubber industry labor and management on his tentative finding that the prevailing minimum wage rate in the tires and related products industry is $1.77 per hour. He is expected within the next two or three months to issue a final ruling on the minimum wage to be paid in this industry for work performed under Federal Contract.

The minimum wage determination for the "tires and related products industry," required under the Walsh-Healey Public Contracts Act, has been in the works for well over a year. In fact, the Labor Department first set about pegging a minimum wage for the tire industry back in the Korean War, but for a number of reasons never got around actually to starting proceedings until late 1957. Hearings in the case were conducted by a Department trial examiner last October and November.

While his tentative conclusion was that the prevailing minimum wage is $1.77, Mitchell said beginners or probationary workers could be employed on federal supply contracts at a rate of $1.67 per hour. Apprentices and handicapped workers, his finding continued, may be employed at less than the $1.77 minimum under special conditions laid out in the Walsh-Healey Act.

In issuing his tentative ruling on October 28, Mitchell gave interested parties 30 days to file answers. Department officials said that unless either management or labor raises substantive challenges of the proposal, in which case hearings might be reopened, the final decision could be pushed through within the following 60 or 90 days.

The Department's finding that the minimum wage is $1.77 constitutes something of a compromise of the minimums which rubber industry management and labor suggested. During the hearings, counsel for the rubber companies suggested the floor wage be pegged at $1.54 per hour. At the same time, lawyers for the AFL-CIO United Rubber Workers Union suggested the minimum should be $1.93 hourly. The rates would apply for labor performed on all government contracts exceeding $10,000 in value.

Rubber company legal counsel opposed the fixing of a minimum for public-contract purposes for three main reasons, expressed during the hearings last year. First, they said, it was illogical to except tire repair materials from the definition of the tires and related products industry. Second, they said application of the minimum to plants which produce goods in addition to tires, tubes and camelback—as most do—would make it administratively "impractical" for the companies to have one pay scale and wage system for one group of employes and another for those working on federal orders. Third, counsel for the companies said industry labor was among the highest paid in the nation and disputed the likelihood of any company obtaining a government contract on the basis of "substandard" wages.

The URW's argument was that the minimum should be pegged at $1.93—$1.85 in basic hourly wage and an additional 8¢ to reflect the 1958 across-the-board wage increase. The wage increase agreed to by the companies in 1959 is likely to boost the Union's estimate, expected to be filed in URW's exceptions, as to what the minimum should be.

In announcing Mitchell's minimum wage finding, the Department said government purchases of tires and related products under the Act have run about $60 million a year. It said the industry has about 70,000 production workers in 64 establishments having 10 or more employes.

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To Produce Stan-Tones

Polymer Dispersions, Inc., a newly formed company, has installed production facilties to produce polymer color dispersions and concentrates at Fairport Harbor, O. The sales will be handled by Harwick Standard Chemical Co., Akron, O., under the Harwick Stan-Tone registered trade name. Banbury and other necessary equipment is available to produce, pelletize, and package polyethylene color concentrates and cutbacks (under the Stan-Tone PE designation) as well as other dispersions to customer needs in the blow molding, filament, film, pipe, and wire and cable industries.

Harwick Standard will continue customer service and color matching work at its Akron color laboratory. Research and development will be handled at the Polymer Dispersions' laboratory.

INDUSTRY NEWS

Rubber Trends, Marketing, Legislation at RMA Meeting

More than 200 of the rubber industry's top executives attended the forty-fourth annual meeting of The Rubber Manufacturers Association, Inc., held at the Park Lane Hotel, New York, N. Y., on November 20 to hear a program which covered a review and a forecast on rubber and rubber-like materials, marketing in the 1960's, the impact of legislation on business, and which concluded with a luncheon address by General Carlos P. Romulo, Philippines Ambassador to the United States.

Ross R. Ormsby, RMA president, presided at the morning and luncheon sessions and in his introductory remarks at the morning session pointed out that the industry will set a new record for the consumption of new rubber in the United States this year at approximately 1,615,000 long tons, for the production of tires and many other products, and for the production of synthetic rubber at 1,350,000 tons.

Mr. Ormsby also traced developments in connection with the government's recent decision to dispose of 470,000 long tons of natural rubber from the strategic stockpile over the next few years since it had finally been decided that this amount was in excess of security needs. The industry has believed for some time that the stockpile contained a burdensome surplus of rubber maintained to the detriment of the American taxpayer and had notified the government of its views. An orderly, definite, and publicly stated plan for disposal of surplus rubber from the stockpile will not only effect a savings to the taxpayer, but will be in the long-term interest of both producers and consumers of natural rubber alike, he added.

Reviewing the industry's industrial relations problems over the past year, the RMA president said there is no such thing as a rubber industry pattern of collective bargaining, and there should not be. The economics of producing tires, as against molded and extruded items, heels and soles, rubber sundries, rubber footwear, and many other products is as different as day is from night. If all segments of the rubber industry are to grow and expand and provide more and better jobs, responsible union leadership must recognize the economic facts of life as they vary among the separate branches of the rubber industry.

Lead-off speaker at RMA annual meeting, G. R. Vila, United States Rubber Co.

Mr. Ormsby pointed out also that many rubber industry companies negotiated in 1959 on general contract issues, pensions, and insurance agreements and then, later in the year, on wages. These prolonged series of negotiations are expensive to both management and the union, and companies have attempted to consolidate these bargaining sessions, but the union has thought otherwise. Union leaders should cooperate with our individual companies in bringing about one set of negotiations, it was said.

RMA Board Elections

RMA members at the annual meeting elected Pierce Sperry, president, Sperry Rubber & Plastics Co., and J. E. Trainer, vice president, Firestone Tire & Rubber Co., to their board of directors for three-year terms.

Reelected for the same term were: Thomas Robins, Jr., chairman of Hewitt-Robins, Inc.; J. H. Matthews, executive consultant of Raybestos-Manhattan, Inc.; J. P. Seiberling, chairman and president, Seiberling Rubber Co.; and J. W. McGovern, president, United States Rubber Co.

Arthur Kelly, executive vice president, B. F. Goodrich Co., was elected to fill an unexpired term.

Economics and Trends in Rubber

George R. Vila, group executive vice president, U. S. Rubber, discussed "Economics and Trends in Rubber and the Newer Rubber-like Materials," as the first speaker on the morning program. Mr. Vila said the rubber industry stands on the threshold of a future far more promising than anything experienced in the past; in fact, the industry is in the midst of a technological evolution from which it should emerge with new dimensions, increased vigor, and broader horizons.

He acknowledged his indebtedness to the RMA statistical committee for the survey of the present state of the in-

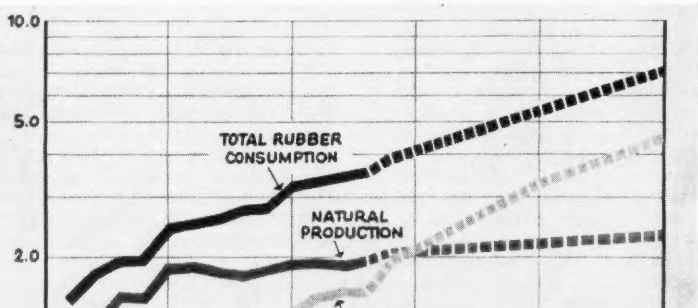


Fig. 1. Long-range world trends (million long tons)

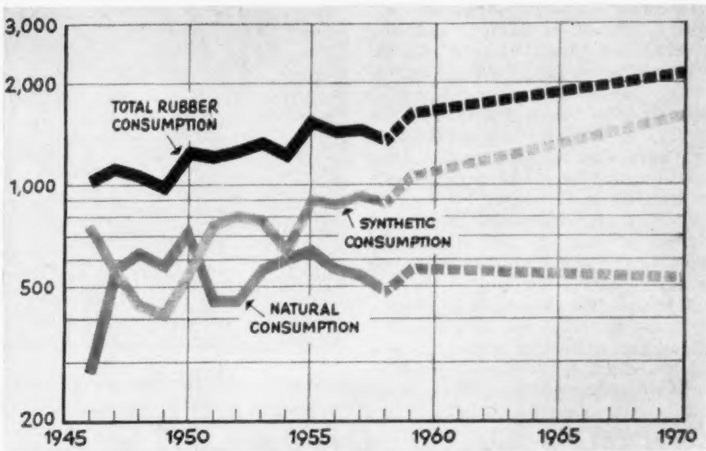


Fig. 2. Long-range trends in the U.S.A. (thousand long tons)

dustry and also for estimates of future rubber consumption, which survey and forecast were used as a basis for his talk.

The technological evolution of the industry began with the introduction of oil-resistant synthetic rubbers in the 1930's and was accelerated with the advent of general-purpose synthetic rubber (SBR) production in World War II, which eliminated dependence on natural rubber and gave the industry a broader and more effective base for expansion.

Turning to the world and U.S.A. rubber supply-demand situation, this speaker estimated that the world will consume 4.2 million long tons in 1960, nearly 5.5 million tons in 1965, and about 7.5 million tons in 1970, as against the 4 million tons in 1959. Natural rubber supplies are expected to stabilize at between 2 and 2.3 million tons over the next 10 years so that the production of synthetic rubber appears destined to double over this same period (See Figure 1.)

In the U.S.A., it was predicted that 1.65 million tons of rubber would be used in 1960, somewhat less than 2 million tons in 1965, and somewhat more than 2 million tons in 1970, as compared with the record 1.62 million tons used in 1959. It was noted that by 1970 the U.S.A. should have 2 million tons of synthetic rubber capacity to meet an annual demand in the order of 1.7 million tons, which would be adequate for domestic needs and provide a surplus for export and hedges against delays in Soviet bloc production, or a breakdown in supplies of natural rubber from Indonesia. (See Figure 2.)

Mr. Vila saw the U.S.A. using three pounds of synthetic for each pound of natural in 1970 and the world using about three pounds of synthetic for every two pounds of natural by 1970.

World synthetic capacity and demand from 1958 to 1970 is shown in Figure 3. The demand line cutting across the chart is a projection made by RMA statisticians. In computing Soviet bloc statistics, statements by the USSR premier in 1958 in which a seven-year industrial expansion program was outlined, were used. An indicated total synthetic rubber capacity of 1.5 million tons for Soviet bloc countries by 1965 was considered optimistic and reduced. The dotted section above the Soviet bloc estimates represents the difference between the scaled-down figure and those of the announced seven-year plan.

U.S.A. synthetic rubber capacity through 1960 was reviewed with special reference to oil-extended SBR, the neoprenes, butyls, nitriles, urethanes, and the new synthetic "stereo-regular" polyisoprene and polybutadiene. It was pointed out that 85% of our SBR production is cold rubber; about one-half of our consumption is oil-extended SBR; and that the use of SBR black masterbatches is on the upswing. Recent new developments with neoprenes, nitriles, and butyl indicate promising futures for these rubbers. The synthetic polyisoprenes and polybutadienes are replacing natural rubber in such applications as heavy-duty tires; other "stereo-regular" rubbers will make a strong bid to take a share of present SBR outlets as new polymerization techniques challenge established emulsion methods, Mr. Vila declared.

Urethane rubber is making progress in its competition with natural and SBR in the foam rubber market and has possibilities in many applications as a solid rubber if its relatively poor low-temperature performance and moisture sensitivity can be solved. The liquid urethane rubber could also have tremendous impact on manufacturing techniques that lend themselves to a high degree of automation, it was said.

Since urethane is variously defined as a plastic and a rubber, a review of the plastics industry was made because many rubber companies are major producers as well as consumers of plastics, the speaker pointed out. In this connection, it was estimated that 5.6 billion pounds of plastic materials will be turned into products by U.S.A. manufacturers in 1960, as compared with 3.64 billion pounds of rubber.

The two leading plastic materials, polyethylene and polyvinyl chloride, are flexible or rubber-like in character and are therefore being used by rubber companies since they compete directly with rubber in some important markets. Rubber companies have entered the plastics field because the processing is similar to rubber production methods; many plastics have grown through invasion of markets previously served by rubber; and the versatility of plastics has led to new applications which have broadened the horizons of rubber companies.

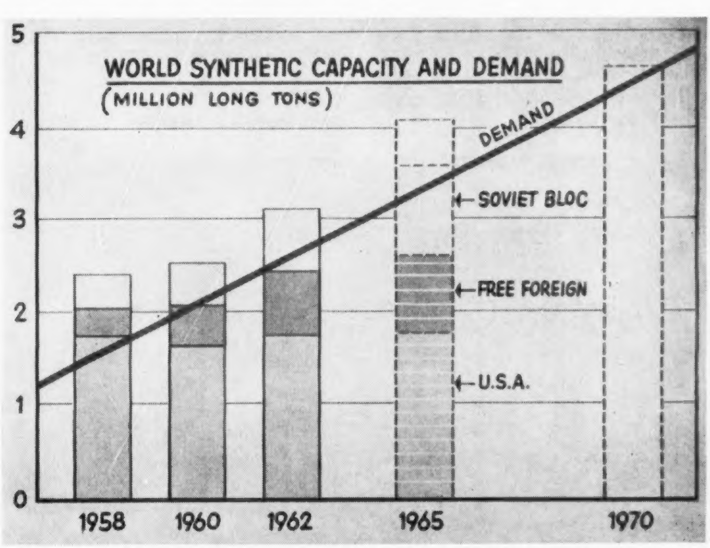


Fig. 3. World synthetic capacity and demand (million long tons)

Mr. Vila suggested that within the foreseeable future the rubber industry will evolve into a polymeric complex in which the hazy line now separating plastics from rubber will be completely erased, and the rubber manufacturer will have a widening array of raw materials with a degree of versatility he has not previously known. He concluded that the modern rubber industry, which has had the vigor and inventiveness to reach its present state of development, will also have the vision and dynamics to exploit fully the opportunity now before it.

1960 Rubber Marketing Outlook

Earl B. Hathaway, vice president in charge of sales, Firestone Tire & Rubber Co., in his talk on the "Marketing Outlook for Rubber in 1960," told rubber manufacturers that they face in the "Selling 60's" a decade that will test their distribution and marketing techniques as they have never been tested before.

The rubber industry during recent years has been very competitive, and as a result, manufacturing processes, products, and selling techniques have been improved, and that is why the industry has reached the heights it has attained today. Mr. Hathaway believes, however, that the selling competition of the last 20 years was of the amateur variety compared with what the hard-hitting selling and merchandising competition of the new decade will be. Among the reasons why selling competition will grow even tougher is that imports from abroad are increasing in volume and competitive impact, research and development are sharpening the rivalry between rubber and an ever-widening array of plastics products, and the evolution of the American consumer as a more selective and more sophisticated buyer.

To meet this challenge it is now more important than ever that selling, advertising, merchandising, and marketing—the whole broad area sometimes grouped under the heading of distribution—receive more attention than it has ever had before. Distribution has not been so effective as production, and now greater effort must be made to bring the effectiveness of the American distributive process in the rubber industry, as in other industries, nearer to the levels already achieved in the product development and production portion of the American industrial picture, this speaker emphasized.

In 1960 and the years ahead there will be a need not only of effective marketing work, but also of efficient marketing work. We want to be successful in selling, but we don't want to have it cost too much, he added. We are not in the business merely to sell; we are in business to make money.

In conclusion, some predictions were offered as regards tire and non-tire products. New types of tires will be developed and sold, and new and improved types of rubbers will be used in these tires, it was said. More and more rubber roads, rubber rail crossings, rubber sidewalks and conveyors of people as well as goods, more applications of rubber in clothing and in building and in transportation machines are on the horizon for the coming years. Rubber will also find a wide variety of new applications in many industries not at all related to those mentioned, the speaker added.

The "Selling 60's" hold the possibility of great sales and great profits, and Mr. Hathaway said he was convinced that the rubber industry will rise to its opportunity, and that when the decade comes to an end, the industry will look back on it as the greatest selling period of all time.

Legislative Impact

The panel discussion on "Legislative Impact on Business" had as its moderator RMA Vice President W. J. Sears, who is also chairman of the Association's public affairs committee. Panel members were Representative William H. Ayres of Ohio; and Stephen F. Dunn, vice president, National Association of Manufacturers. Paul Hencke, associate editor of *The Nation's Business,* was prevented from participating as a member of the panel because of sudden illness.

Speaking on the rubber marketing outlook was E. B. Hathaway, The Firestone Tire & Rubber Co.

In answer to a question as to why the record of the first session of the 86th Congress was surprisingly conservative, Ayres said he believed it was because the American people became aroused, and that the mail received by Congressmen on issues such as labor legislation was terrific. It was necessary on the labor legislation issue, however, for President Eisenhower to go before the public in order to swing the balance in favor of the Landrum-Griffin bill. Dunn expressed the opinion that the conservative record of the last session of Congress was due to people like Ayres in the Congress who fought in the open and thus forced other Congressmen to take stands which they otherwise might have tried to avoid.

With regard to the areas not covered by the Landrum-Griffin bill, Dunn mentioned monopolistic power of unions, industry-wide bargaining, and the fact that local unions cannot bargain directly with management.

Ayres, in answer to a question on new labor legislation in the next session of Congress, said that if the steel strike is not settled when Congress returns in January, such legislation is possible since the government will not permit the steel strike to continue. If the strike is settled, no labor legislation is likely to be enacted. Dunn expressed his concern over the possibility of a railroad strike and a renewal of the longshoremen's strike. He also suggested that if business did not approve of the proposed compulsory arbitration bill of Sen. Wayne Morse of Oregon, an alternate proposal should be prepared.

Anti-trust laws carried over from the last session of Congress were next discussed, and Rep. Ayres felt that the civil affairs bill would be passed; the S-11 or "fair trade" bill would not; and he expressed his concern about the effects on the business community if the premerger notification bill and the preprice bill were passed. He doubted if there would be any action on revisions

Legislative effects on business being discussed by *(left to right)* W. H. Ayres, panelist; R. R. Ormsby, chairman; W. J. Sears, moderator; and Stephen F. Dunn, panelist, at RMA annual meeting

in the income tax law in the election year of 1960. Dunn was anxious for income tax law changes in order to improve business conditions.

Questioned on the effectiveness of the renewed interest of business in legislative matters, Ayres said contacts with Congressmen by individuals rather than corporations or associations was most effective. Dunn claimed the NAM was first in the field of urging its members to become more active in making their ideas on legislation known to Congressmen, but admitted that business had made some mistakes in its approach and had much to learn.

"Southeast Asia Today"

In introducing General Romulo at the luncheon meeting, Mr. Ormsby expressed the very great appreciation and honor done the Association by the General's willingness to be the speaker at the RMA annual meeting. He mentioned some of the speaker's many achievements as a soldier, statesman, and Pulitzer prize winning author prior to becoming Ambassador to the United States from the Philippines in 1955.

General Romulo devoted considerable time to discussing the race for world power between the USSR and the U.S.A. before dealing with his prepared talk on Southeast Asia. When we speak of Southeast Asia, we must not overlook the one central fact in Asian life today which is nationalism. It is this new nationalism that must sweep away the heritage of the past in which one nation or group of nations dominated others, the General said. The driving force behind Asian nationalism is essentially a fight for equality, insistence on recognition of Asians' rights as human beings, and assurance that they are not and will not be discriminated against. They err, and err grievously, who confuse this regnant nationalism with communism, however, he added.

It was emphasized the American people had a vital interest in this situation because the uncommitted nations of 500 million people in Asia were neutrals, not siding with either the U.S.A. or the USSR, and that in our struggle with Communism this represents a minus, and a formidable minus when the 600 million Chinese who are against the U.S.A. are added to make a total of more than one billion Asians that must be deducted from the forces of democracy against Communism.

Economic aid is important; so is technical assistance, and both are appreciated when given to any recipient country in Asia, but at this juncture in their national history, equality is paramount to them, General Romulo said, and it is this point that he wants to emphasize to the American people. To the pragmatic Western mind it is difficult to understand the Asian emphasis on equality over economics. The Asian is used to poverty and hunger; more important to him after centuries of indignities and humiliation is respect for the dignity of his human soul.

If it is true that the democratic way of life is the spiritual way, then it is essential, if it is to win adherents in Asia, for it to be projected as one that places the highest value on the human individual, that it acknowledges that we are all created in the image of Our Lord, and thus created, we are equals no matter what the color of our skin or the name of the church where we worship. The test of American spirituality in Southeast Asia, therefore, lies in how an American practices that one line in his Declaration of Independence: "All men are created equal," General Romulo said in conclusion.

RMA luncheon speaker, Carlos P. Romulo, with industry leaders *(left to right)* H. E. Humphreys, Jr., United States Rubber Co.; J. W. Keener, B. F. Goodrich Co.; General Romulo; Harvey S. Firestone, Jr., Firestone Tire & Rubber Co.; J. L. Collyer, Goodrich; and Ross R. Ormsby, RMA

New Merck Emblem

New Merck Marine Magnesium Emblem, Effective January 1

Adoption of a distinctive emblem (see illustration) for Merck Marine Magnesium division, with stylized white sails on a marine blue background, will be made January 1, by Merck & Co., Inc., Rahway, N. J.

Merck Marine Magnesium formerly used a double insignia: the Merck cross, plus the illustration of a smaller, square-rigged sailing ship. The up-dated design will be used on technical service sheets with white sails on a blue background. On letterheads, Marine Magnesium will reverse the colors, using blue sails on a white background. Labels will carry an enlarged illustration of the ship, and product name and description will be imprinted in the white sail areas.

Designer for the new letterhead and label line was Ernst Ehrman, industrial designer, working with the Merck package design staff.

Merck now supplies industry with a variety of magnesium-based chemicals.

Goodrich Test Track

What is said to be the world's shortest tire test track has been built by The B. F. Goodrich Co. at its research center in Brecksville, O. Though less than a mile in length, the track has a series of flat curves, sharp S turns, and built-in road bumps. It was designed to give ideal conditions for studying ride quality, steering, skid resistance, and tire noise, according to W. F. Billingsley, technical director of the company's tire division. Purpose of the track is to evaluate these qualities in experimental tire designs.

Increased research on tire riding and operating qualities is needed to help tire designers meet the growing demand for quieter-running tires. In the past the testing of these operating qualities in tires was carried out on highways and city streets, but the engineers were often handicapped by traffic and by the changes that were constantly being made in the road surfaces.

To secure accurate test data, it is important that road conditions remain constant to allow for comparisons of different tests made over a period of time. The new test track not only gives the best possible conditions for making tests, but it enables the testers to keep the conditions under absolute control.

Industry News

Goodyear Announces Latex for Use In 100% Synthetic Foam Products

An SBR rubber latex was announced on October 28 at the Park Lane Hotel, New York, N. Y., which the developer, The Goodyear Tire & Rubber Co., Akron, O., claims will produce foam and carpet backsizing without the addition of any natural latex. The latex, named Pliolite Rubber Latex 5352, will produce foam of very light color, greatly improved long-term aging, a pleasing neutral odor, and has bacterial and fungicidal values greatly improved over those of the natural product, it is further claimed.

According to R. A. Jay, assistant to the president, Goodyear, this new latex will be sold at 20 to 30% under the natural latex price. Production facilities at Goodyear's Akron latex plant, the world's largest, have already been expanded to meet anticipated demand for this new product. Jay stated that the product was the result of an 18-month program which cost about a million dollars, and that it was an important milestone in latex technology. The material is closer to natural latex than any previous synthetic latex in that the impurity content has been reduced to equal that in the natural product.

The technological breakthrough that produced this latex was described by T. H. Rogers, manager, latex and foam research. Rogers discussed some history of synthetic latex and said that previous synthetic latices were suitable for only a partial replacement for the natural product. The reasons for this belief he suggested were a higher nonrubber content for the synthetic along with a smaller particle size and often an unpleasant chemical odor.

Pliolite 5352 is a styrene-butadiene copolymer like previous SBR latices, but, according to Rogers, is made from a new unique polymerization formulation. Although details were not disclosed, it was stated that the butadiene and styrene are brought together for a relatively short period of time in continuous reactors. The molecular weight of the rubber particles is made to an exact optimum condition. The individual spheres of rubber are developed to selected sizes to result in a latex having excellent rheological properties. The new latex is more fluid than natural latex, allowing it to be concentrated to a much higher total solids content and thus allowing the technologist much greater scope in the use of pigment extenders in foam manufacture. The latex also results in less shrinkage of the foam during processing.

Some other plus properties of the new latex listed by Rogers included low gel content, excellent mechanical stability, freedom of coagulum, and low surface tension.

Advantages of this latex for foam, compared to vinyl, were claimed to be lower density, better resilience, and improved odor. Compared to urethane foam, the latex foam can be molded more easily in a variety of shapes and is more resilient. It has a superior deflection-compression factor so that it does not "bottom out" on prolonged use.

Optimism for the reception of the new latex was expressed by H. R. Thies, general manager of the chemical division, which will sell the new product through its coatings department. He suggested that uses other than foam, such as the rug backsizing, will also require large amounts of the latex. Particular mention was made of the reception already afforded trial quantities of Pliolite 5352 in some overseas areas. Claiming a first, Thies said that 9,000 gallons of this latex had been shipped on a Swedish vessel from Cleveland through the St. Lawrence Seaway, destined for a manufacturer at Manchester, England. Thies expressed the belief that this latex was the first to be shipped via this route and that it will be the first of many shipments of the new latex to overseas destinations.

Processing acceptance of the material was discussed by R. E. Pauley, general manager of foam products division, which will utilize this latex in the manufacture of foam products under the Goodyear trade name of Airfoam. It was stated that such products as pillows, mattresses, and seating pads would be made of 100% Pliolite 5352 latex.

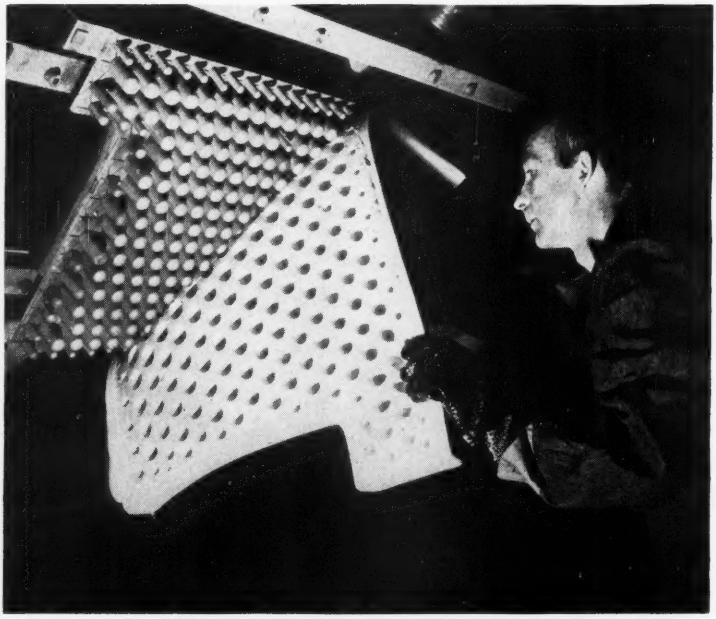
Pauley suggested that the latex permits the following advantages to the foam producer. The basic raw material and its accompanying market will be stabilized. The new synthetic latex will be delivered with more uniform quality. The source of the material is in the user's "backyard." Tests indicate that the latex will afford the consumer a better aging and improved hygienic end-use product.

In summary, Pauley said, "We are convinced this new latex provides us the opportunity to use a basic raw material which will give the American public the best cushioning material at the most economical cost."

Two Tech Book Facts bulletins have been prepared on this latex. PLL-13 gives the types and properties of "Pliolite Rubber Latex 5352"; while PLL-14 gives formulations for producing "Carpet Backsizing with Pliolite Rubber Latex 5352."

Witco West Coast Lab

Witco Chemical Co., Inc., is constructing a new laboratory and plant-office building in Los Angeles, Calif. Located on the site of two Witco plants—one, an organics chemical division operation for metallic stearate production; the other, an Ultra Chemical sulfonation unit—the installation will provide both with expanded and modernized laboratories for control and customer services. Completely new equipment and air conditioning throughout are included in the project plans.



Molded Airfoam furniture cushion which is made from all-synthetic latex being stripped from the curing mold by the operator

Main building at Esso Research & Engineering Co.'s new Florham Park, N. J., research center

Esso Research Dedicates New Center At Florham Park, N. J., on November 5

Esso Research & Engineering Co., the principal scientific and engineering affiliate of Standard Oil Co. (New Jersey), dedicated a new research center at Florham Park, N. J., on November 5 in a program in which George B. Kistiakowsky, President Eisenhower's scientific adviser; Governor Robert B. Meyner of New Jersey; and top executives of the company, including Eger V. Murphree, president of the parent firm, took part. Located on 675 acres of an historic estate in northern New Jersey, the new facilities consisting of three new structures will initially be devoted to engineering and oil processing research. Headquarters activity and other research will continue at the Esso Research Center 20-building facilities in Linden, N. J.

Dr. Kistiakowsky stressed the importance of basic research in international affairs. He emphasized that an industrial company has no better choice but to continue vigorous basic research programs, if it wants to be sure at all times that it will be truly first and that in key technological areas it will be the undisputed leader instead of being part of the crowd that fights for the left-overs.

As a scientist who has had some experience both in basic and applied research, Dr. Kistiakowsky said that except in areas critical for our national security, it is both illogical and unsound for us to chart our own technological course on the basis of what the Russians are doing. In terms of total technology, the two nations are at quite different levels of development; hence the requirements for applied research, engineering, and other aspects of technology are correspondingly different. As far as basic research is concerned, its full support and encouragment are important to any nation that would hold its own in the scientific revolution that characterizes our age. To the leader of the free world, such support is urgent and indispensable, he concluded.

Marion W. Boyer, director of the Standard Oil Co. (New Jersey) and former general manager of the Atomic Energy Commission, said the new center "reflects what is surely one of the most dramatic business developments in recent years: the rapid growth of industrial research into a multi-billion dollar venture."

Esso Research originated in 1919 as a department of the parent company, with a staff of 26 persons; today there are more than 3,000 scientists, engineers, and their aides, 800 of which are now stationed at the Florham Park center.

Other points made by Mr. Boyer were as follows: (1) Research and engineering technology advances are reducing capital costs about 5% per year, which in Jersey Standard's case would amount to almost \$25 million yearly. (2) Engineers at the new center are planning and supervising some \$350-million worth of refinery construction and modernization around the globe. (3) Jersey's investments in petrochemical refining plants should rise to about \$400 million by 1962.

The firm's engineering research is under the direction of Vice President Charles E. Paules. Vice President E. J. Gohr is in charge of petroleum processing research.

The largest of the three buildings at Florham Park is the three-story engineering building which serves as headquarters for the company's engineering divisions. The other two structures are the process research building, where large- and small-scale process experiments are conducted, and a services building. A feature of the new center is an IBM 704 digital computer which in one day can do computations that would take 35 skilled mathematicians their entire lives to work out.

Copolymer To Expand "Carbomix" Output

Copolymer Rubber & Chemical Corp., Baton Rouge, La., plans a \$3-million expansion project. An increase in the capacity for production of Copolymer's new "Carbomix" rubber will be the primary goal, according to A. K. Walton, president.

"Carbomix" is the synthetic rubber with carbon black already added which Copolymer is now furnishing to its tire-producing customers. Getting the black into synthetic in its latex stage is said to increase tire mileage and to improve tire manufacturing procedures.

Also included in the expansion plans are a new 95,000-square-foot warehouse and enlargement of pilot-plant facilities employed by the Copolymer research staff.

The expansion project should be completed in a year. By that time, capacity of the plant will be increased to 125,000 tons of rubber per year. When Copolymer was purchased from the government in 1955, the plant's annual capacity was 49,000 tons.

Seiberling Rubber Co., Akron, O., one of the co-owners of Copolymer, is one of the customers creating heavy demand for "Carbomix." Seiberling has been producing all of its passenger tires with what it calls "Carbojet Tread" since the Copolymer development.

Co-owners with Seiberling of Copolymer are The Dayton Rubber Co., Armstrong Rubber Mfg. Co., Gates Rubber Co., Armstrong Rubber Co., Mansfield Tire & Rubber Co., and Sears, Roebuck & Co.

Plans Philblack Plant Near Orange, Tex.

Phillips Chemical Co., wholly owned subsidiary of Phillips Petroleum Co., will construct a new 60-million-pound per year carbon black plant near Orange, Tex., according to K. S. Adams, chairman, and Paul Endacott, president of both companies. The plant is being built to help meet the high and growing demand for carbon black, which is in short supply.

Plant design has been completed, and purchase of materials and equipment is under way. Completion is scheduled for the third quarter of 1960.

The new plant will produce both Philblack O and Philblack I, trade names for special carbon blacks developed by Phillips. The firm perfected in 1942 the first high-quality, high-yield black made by a furnace process from oil. The demand for these blacks has resulted in expansion of the company's carbon black plant near Borger, Tex., to a present capacity of 290 million pounds per year, making it the world's largest, according to Phillips.

Industry News

Anchor Industries Expands Its R & D

The research and development laboratories of Anchor Industries, Inc., center of quality control and product improvement for Doan motor mounts and related products, have been expanded fivefold. The expansion included the completion of new installations at the main plant, 1725 London Rd., Cleveland, O., at an expenditure of $100,000.

Five full-time chemists and laboratory technicians staff the chemical and rubber laboratories, with Doan engineers and outside specialists providing regular consulting service. In addition to personnel and space expansions, several new installations, including testing and research equipment, have been purchased or built by Doan engineers for thorough quality control of the motor mounts, floor mats, and other Armor-Flex rubber automotive accessories and replacement items for the Doan manufacturing division of Anchor Industries.

After research and development has established the raw materials needed for various products in laboratory pilot-plant units, each incoming shipment is checked by chemists for physical properties, cleanliness, color, and general appearance. Quality-control points have been established at various steps along the route to the finished goods.

Materials and finished motor mounts are put through severe inspections ranging from pull tests to determine adhesion between steel and rubber; checks on resistance to oil, heat, compression and tearing; to basic qualities as an elastomer—needed to absorb motor vibrations.

A. E. Brooks Retires

Arthur E. Brooks, assistant director of research and development for United States Rubber Co., Wayne, N. J., was tendered a retirement dinner at the North Jersey Country Club in Wayne on October 29 by 125 of his associates from the company's research center.

Dr. Brooks retired the following day after 30 years with the rubber company. His work with U. S. Rubber included coordination of research on the rubber battery separator, development of a porous rubber-bonded form lining for concrete walls, and the institution of statistical quality control methods in small arms manufacturing. He holds four patents in the rubber and plastics field.

His early experience with the company included 12 years as a research chemist at the firm's general laboratories when they were in Passaic, N. J., three years during World War II as technical director of the Des Moines, Iowa, ordnance works, and three years as department head, organic research, at the general laboratories.

Pach Bros., N. Y.

Arthur E. Brooks

In 1947, Dr. Brooks was promoted to assistant to the company's director of research and in 1950, manager of the general laboratories. When the firm opened its new research center at Wayne in 1957, Dr. Brooks continued as manager of the installation and in 1958 was promoted to assistant director of research and development of the company.

Dr. Brooks was graduated from Johns Hopkins University in 1915 and received his M.S. and Ph.D. degrees from the University of Chicago. While studying for his doctor's degree he was head of the science department of the Hinsdale, Ill., high school.

Speakers at the dinner included W. A. Gibbons and S. M. Cadwell, former directors of research for the company, and L. M. White, present director. Thomas J. Rhodes was master of ceremonies and presented Dr. Brooks with a movie camera and projector on behalf of his associates.

Dr. Brooks was also the guest of honor at a luncheon of the research center's 25-Year Club at the Wayne Country Club on October 28. Fifty active and retired members of the club attended. A gift of luggage was presented to Dr. Brooks by Walter C. Lingvall, industrial relations manager of the center. Toastmaster was R. H. Gerke.

UCC Reduces Prices Of L-520 and XL-521

Silicones division, Union Carbide Corp., New York, N. Y., has cut the prices of Union Carbide L-520 and XL-521 organo-silicone copolymers, widely used as surfactants in the manufacture of polyurethane foam, effective November 2. The cut in five-gallon drums was from $2.90 to $2.65 a pound, and in 55-gallon drums, the change was from $2.80 to $2.56 a pound.

The decrease in price is possible because production of these two fluids has been greatly stepped up to meet the needs of chemical, rubber, and other companies using them in the one-shot polyurethane foam process. These organo-silicone copolymers are essential ingredients in the process.

The price reduction is not for competitive reasons, reports the company. It is passing on the economies of larger-scale production to customers, and any contribution that Union Carbide can make further to stimulate growth of this expanding industry will be of benefit to both customer and Union Carbide.

Price includes freight from the plant at Long Reach, W. Va., to any point in the United States, except Alaska and Hawaii.

New Patent Service

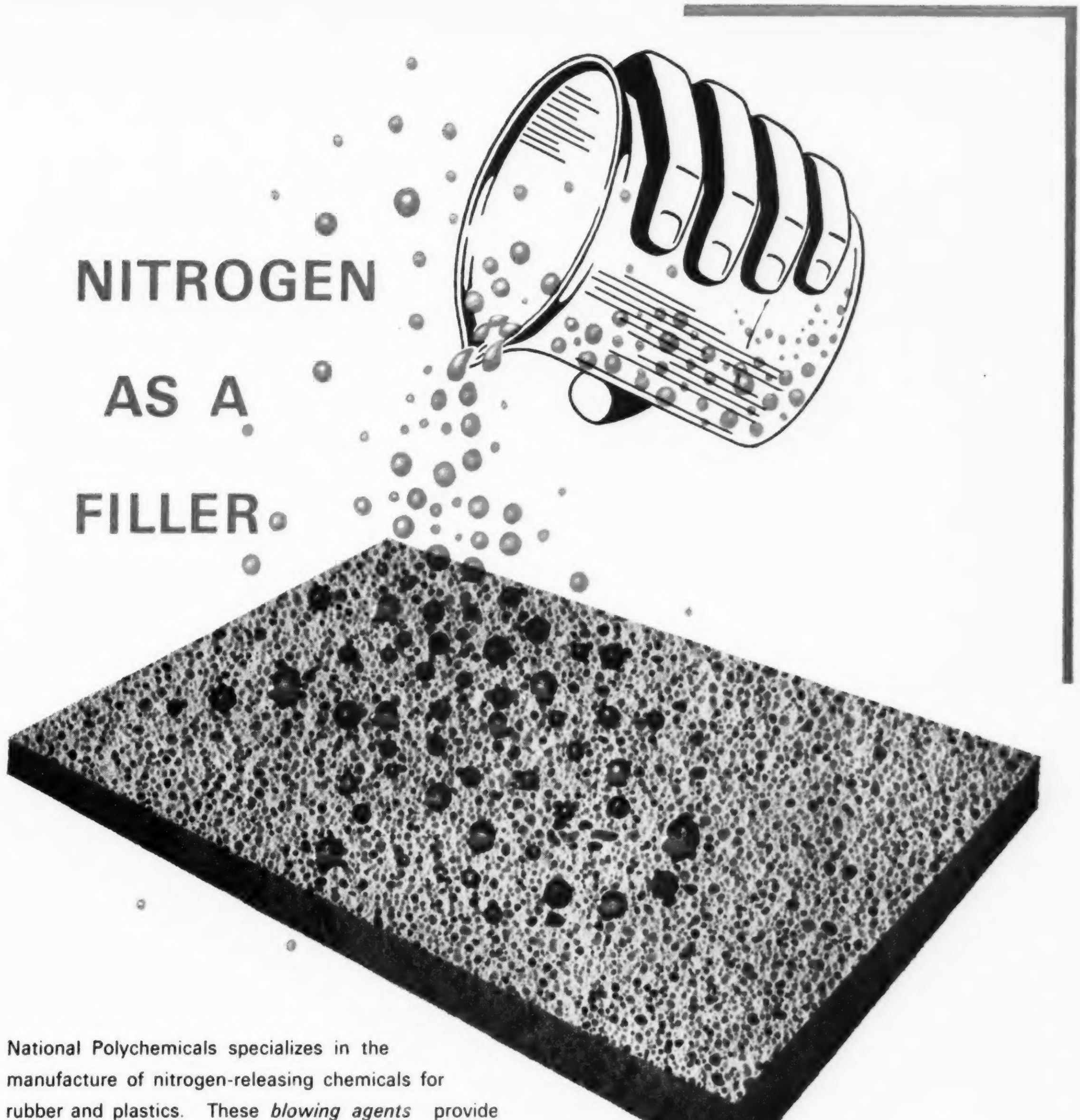
Industrial Patent Research Co., Columbus, O., is now offering a unique service especially tailored for management and research and developement staffs of electronics, petroleum processing, petrochemical, chemical, and related firms. The service entails the reduction of technical patents to easily understood digests of basic principles. These short summaries of patents, free from legal terminology and redundant detail, can be scanned and understood in a few minutes by scientific personnel. Thus, personnel are kept apprised of new developments revealed in patents, obtaining maximum useful information in minimum time.

Clients of this service can assimilate 50 to 100 or more patents a week in less time than is required to review a single lengthy patent, when provided with these concise patent analyses. The analyses are time-saving research tools which can realize significant cost savings.

Patents to be analyzed are provided by the client to IPR which then prepares the analyses in accordance with an agreement established between the two companies. These concise extract-abstracts are then distributed to designated personnel of the client company. The latter are kept promptly and permanently informed of significant developments, past and present, in their fields of interest.

A more complete description of the services offered by IPR, examples of patent analyses in typical fields of interest, and further information are available from Philip E. Corbett, director, Industrial Patent Research Co., 2266 E. Main St., Columbus 9, O.

NITROGEN AS A FILLER



National Polychemicals specializes in the manufacture of nitrogen-releasing chemicals for rubber and plastics. These *blowing agents* provide a means of supplying nitrogen in the form of small gas "particles" within the rubber or plastic structure. Regardless of what you manufacture, you should investigate the possibilities of improving your product or lowering your cost by this technique.

This is a new and exciting concept in the compounding of rubber and plastics. Whatever your objective – lower volume cost, lower hardness, better thermal or electrical insulation characteristics, improved cushioning properties, reduced weight or increased buoyancy – you should give consideration to this new approach in the formulation of your stocks.

As specialists in this field, we are ready to assist you in the use of nitrogen as a new compounding ingredient. To get started, write to us today for technical "know-how", together with samples of our nitrogen-releasing chemicals, OPEX 40 and KEMPORE R-125.

KEMPORE ⟶ NITROGEN ⟵ OPEX

NP

NATIONAL POLYCHEMICALS, INC.

Wilmington, Massachusetts

Industry News

ASTM Assigns New SBR Nos. 1604, 1800, 1802

TABLE 1. DESCRIPTION OF TYPES OF STYRENE-BUTADIENE (SBR) ELASTOMERS—ASSIGNMENT OF NEW CODE NUMBERS—ASTM D1419-56T

Number as assigned	1604	1800	1802
Date assigned	10/25/59	10/25/59	10/25/59
Requested by	Shell Chemical Corp.	Shell Chemical Corp.	Shell Chemical Corp.
Type	1604	1800	1802
Distinctive feature	low oil-ISAF black	high oil-ISAF black	high oil-HAF black
Nominal temperature, °F.	43	43	43
Activator	FRA	FRA	FRA
Shortstop	ND	ND	ND
Catalyst	OHP	OHP	OHP
Emulsifier	RA	mixed	mixed
Antioxidant	ST	ST	ST
Nominal bound styrene, %	23.5	23.5	23.5
Conversion, %	60	60	60
Mooney viscosity, ML 1 4 (212°F.)—compound	65	55	49
Coagulation	SA	SA	SA
Carbon black type	ISAF	ISAF	HAF
%	35.3 (60 PHR)	35.3 (82.5 PHR)	34.5 (82.5 PHR)
Oil type	HI-AR	HI-AR	HI-AR
Parts	10	51.2	56.8
Finishing	normal	normal	normal

NOTE: Abbreviations and symbols are defined as follows: FRA = free radical type; ND = non-discoloring; OHP = organic hydroperoxide; RA = rosin acid; ST = staining; SA = salt acid; HI-AR = highly aromatic.

Committee D-11 on Rubber and Rubber-Like Materials of the American Society for Testing Materials through subcommittee 13 on Synthetic Elastomers has assigned three numbers to styrene-butadiene elastomers (SBR), SBR 1604, SBR 1800, and SBR 1802, requested by Shell Chemical Corp., Torrance, Calif.

Wyatt's Plastics Buys Houston Rubber Firm

The acquisition of Houston Rubber Co., Houston, Tex., by Wyatt's Plastics, Inc., now offers a major custom molding facility to Southwest industry. Through the combination of facilities, Wyatt's is now capable of molding all thermosetting plastic materials and a complete line of elastomers including nitrile, neoprene, natural rubber, SBR, silicone, "Viton," and Hypalon.

A fully staffed and equipped rubber chemistry department is being added for the rubber operation in order to continue Wyatt's Plastics activity in product research, development, and quality control. Recently Wyatt's introduced a corrosion-resistant thermosetting plastic material for service in chemical plants and refineries. The firm has also been active in research assignments such as developing large molded thermosetting plastic parts for use in extremely high-temperature service in the guided missile program of the United States Government.

Wyatt's is now installing a 2,000-ton molding press to handle large one-piece moldings. This new press combined with existing 1,000-ton and 600-ton presses offers a facility with some of the largest molding equipment in the South.

The Houston Rubber division of Wyatt's will continue the sale and the distribution of standard sizes and manufacture of non-standard sizes of oil tool and industrial grade O-rings. A complete rubber engineering O-ring service is planned.

Personnel of the Houston Rubber Co. will remain with the Houston Rubber division. Ira Frazier will continue as plant manager, and A. T. Schwarzbach, Jr., will move into Wyatt's technical sales staff.

Some Truck Rates for Crude Rubber Revised

The rubber trade may be treated to something of an economic break in the transport of natural rubber from the East Coast to manufacturing centers inland.

The Interstate Commerce Commission late in November authorized eastern trucking associations to cut rates on crude rubber hauled from New York, N. Y., to Indianapolis. ICC made the decision, over the protests of eastern railroads, to give truckers a means "to attract some of this traffic" away from rail carriers.

The lower rate on rubber was scheduled to go into effect November 30. It is $1.16 per 100 pounds on minimum loads of 35,000 pounds, compared with the present $1.46 per pound on a 20,000-pound minimum. The corresponding rail rate is $1.10 on a 70,000-pound minimum.

In its decision the ICC said about 280,000 pounds of crude rubber move each month by rail between New York and Indianapolis, "and the proposed reduction is necessary to permit the motor carriers to attract some of the traffic."

The truck rate reduction was originally filed by Eastern Central Motor Carriers Association, of which the major carrier is Eastern Express, Inc.

An approach ramp to the Ohio Turnpike at the junction of U. S. 21 is resurfaced with a rubberized asphalt compound made by mixing a latex compound with asphaltic concrete. The latex compound is made by the Xylos Division, The Firestone Tire & Rubber Co., Akron, O. The pavement is said to be much tougher than regular asphalt and capable of withstanding the pounding and abrasion of heavy traffic. It can be applied in thinner applications than other types, substantially reducing material costs. Also, it will not turn brittle in cold weather or become tacky in the summertime, it is further claimed by the manufacturer

Tired of Using Liquids to Control Cures on your Hi Sil Compounds?

TRY POLYMEL ACTISIL

Polymel Actisil is a Powder which can be weighed accurately!

ITEM	A	B	C	D
SBR-1502	100	100	100	100
POLYMEL DX-111	20	20	20	20
POLYMEL ACTISIL	1.25	—	2.50	—
TRIETHANOLAMINE	—	1.25	—	2.50
HI-SIL-233	50	50	50	50
ZINC OXIDE	5	5	5	5
SANTOCURE	1	1	1	1
D.O.T.G.	0.25	0.25	0.25	0.25
STEARIC ACID	3	3	3	3
SULPHUR	2.50	2.50	2.50	2.50
TOTALS	183.00	183.00	184.25	184.25

FOR BEST RESULTS

2½ - 6% (based on the Hi-Sil in the compound) is recommended.

Compounds shown were mixed on laboratory mill with 6 x 12 inch rolls.

Ageing severe due to absence of anti-oxidant in compounds.

CURE: MIN. @ 320° F.	3				6				9				12				15			
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
SHORE HDNS.	67-63	67-63	69-66	70-67	69-66	69-66	71-70	71-70	70-68	70-68	72-71	72-71	70-69	70-69	72-71	72-71	71-70	72-71	73-72	73-72
M-300	342	369	428	451	423	425	487	487	462	440	467	437	420	429	470	463	460	473	487	479
M-500	642	656	746	754	799	793	914	946	826	810	860	826	800	801	877	875	883	884	889	905
M-700	1104	1160	1310	1678	1660	1718	1912	2220	1674	1627	1910	1912	1688	1692	1820	2072	1830	1843	1908	2092
TENSILE	1592	1493	1967	2254	2210	2180	2580	2368	2046	1980	2488	2518	2001	2046	2598	2480	1962	2028	2525	2552
% ELONGATION	855	800	830	747	795	750	777	707	745	740	770	733	735	730	777	707	720	730	763	730
% PERMANENT SET	42½	40	45	50	40	37½	45	40	32½	32½	35	37½	30	30	32½	30	27½	27½	30	30
AGED TESTS (24 HRS. @ 100° C. AIR OVEN)																				
SHORE HDNS.	77-76	78-77	76-75	77-76	77-76	78-77	76-75	77-76	77-76	78-77	76-75	77-76	77-76	78-77	76-75	77-76	77-76	78-77	76-75	78-77
M-300	711	695	742	763	705	662	702	707	628	593	600	589	614	583	609	599	623	628	575	592
M-500	1525	1500	1600	1710	1459	1374	1404	1522	1156	1086	1133	1156	1156	1080	1077	1156	1146	1119	1047	1148
TENSILE	1590	1623	1902	1910	1976	1970	2220	1880	1870	1854	2092	2036	1734	2032	2185	1922	1740	1870	2077	2086
% ELONGATION	508	530	515	523	557	565	605	530	610	630	660	613	605	660	695	612	600	640	677	630
% PERMANENT SET	20	20	20	20	17½	20	17½	20	17½	17½	17½	20	17½	15	17½	17½	15	15	17½	17½

PRICES:

2000 Lbs. and Up.....26 cents

1 Drum to 2000 lbs...27 cents

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SALES AGENTS: Summit Chemical Co. Akron, Ohio

Industry News

Garlock sleeve insulator

New Garlock Insulators

Tough rubber sleeve insulators manufactured by The Garlock Packing Co., Palmyra, N. Y., are now being used to insulate the outer case from the solid fuel of rockets and missiles. Garlock reports that it has received a letter of recommendation from the Navy Department on the success of its insulation used in the Pioneer moon rocket launched last fall.

The sleeve is made of a rubber compound developed by the Naval Research Laboratory. Without this insulation the intense heat and velocity of the propellant would burn through the motor casing, causing complete failure of the missile. The insulator is currently being used in the Navy's submarine-launched Polaris missile. Garlock has also developed similar insulators for the third-stage Vanguard, Super Vanguard, Terrier, Super Tarter, Talos Booster, the Air Force's Minuteman, and certain outer space probe vehicles.

The Pioneer insulator was actually built as a third-stage insulator for the Vanguard, but was adopted by the Air Force for use in the moon rocket. Garlock has also developed a filament-wound chamber to encase insulator and propellant. The chamber must be able to withstand the tremendous pressures of the controlled explosion of the rocket engine.

White of Manhattan Rubber Retires

William L. White, technical consultant, retired after 42 years with the Manhattan Rubber Division of Raybestos-Manhattan, Inc., Passaic, N. J. He was director of research and product design until 1957, when at his request his duties were reduced, and he assumed the title of technical consultant, devoting his time to the handling of special projects for the Division.

White joined Manhattan in 1917 as a chemist in charge of reclaiming rubber. He was in production work during the 1920's and was placed in charge of laboratory work in 1931. After serving as assistant factory manager in 1942, he returned to laboratory work as director of research and product design in 1943.

During World War II he was on several rubber industry committees covering raw materials. In 1945, White served on the Technical Industrial Intelligence Commission with rank of Colonel, visiting Germany after the surrender to study the German rubber industry. He took an active part in coordinating the efforts of the laboratory and sales departments by instructing new salesmen in methods of manufacturing, product construction with applications, and mechanical rubber goods design.

Mr. White is a graduate of Penn State, with a B.S. in chemistry in 1913. He started his career with United States Rubber Co., first with its newly organized central laboratory in New York, N. Y., and then with its reclaiming plant at Naugatuck, Conn.

He was honored at a testimonial dinner on October 20 at the Robin Hood Inn, Clifton, N. J., attended by approximately 150 associates and friends. Mr. White gave an interesting talk on his experiences and changes that have taken place in the rubber industry. The toastmaster was C. P. McHugh, director of research and product design. Mr. White's plans for the future are indefinite, but he expects to remain on call in an advisory capacity.

Hamill Receives Award

James J. Hamill, a 1949 University of Colorado graduate and a former assistant instructor in chemical microscopy there, has been presented with the "Dinsmore Award" at The Goodyear Tire & Rubber Co., Akron, O., for his outstanding work in research. Hamill is the first member of the research division to receive the award which is given to Goodyear men who are exceptional in their respective fields.

Hamill was nominated for his work on the development of microscopical techniques and their application to synthetic rubber latex production. His work resulted in improved quality, less troublesome manufacturing procedures, and reduced cost.

Also cited were his hard work, diligence, and long hours in order to achieve his aims. His research lasted for one and a half years. Exemplifying his determination, at one point, he worked continuously for 36 hours to keep track of an experiment.

Hamill joined Goodyear in 1950. He is a member of the Rubber & Rubber-Like Materials Committee and the Microscopy Committee of the American Society for Testing Materials. He represents the entire rubber industry on the latter committee.

Disogrin Now Used On Army Missile Dolly

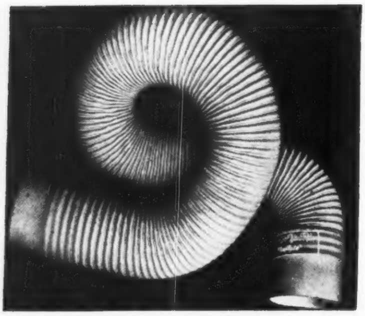
The tough durability of Disogrin polyurethane now plays an important role in servicing the U. S. Army's Nike Hercules missile. The material, manufactured by Disogrin Industries, Inc., Mount Vernon, N. Y., is used as a tread on a special roller guide on the missile dolly, a vehicle upon which the missile is assembled and checked-out.

The key to this operation is the ability of the tread to withstand the 2½-ton load of the missile without deforming or developing a permanent set. These factors have caused the previous treads (made of rubber) to part from the hub, resulting in a failure. Furthermore, the tread had to be non-marking and non-scarring, hence the need of elastomeric material.

In an attempt to secure better service life, aluminum surfaces also were investigated. These were rejected because the aluminum, in contact with the aft missile body surface, would mark and score the latter. Also, when the rubber treads failed, it brought the skin of the missile in contact with the metal portions of the dolly, resulting in scoring and galling of the missile surface.

Prompted by the manufacturer's claim of low deformation under load, no permanent set, and a high-load-carrying capacity, the missile engineers decided to try Disogrin tires. The Disogrin tread passed the tests in every respect. As a result, Disogrin tires have replaced rubber as the standard tread for use on these dollies.

James J. Hamill



New Flexflyte L-1 Flexible Duct

Flexflyte L-1 Duct Meets MIL-H 8796A

Flexflyte[R] L-1, a new grade of highly impermeable flexible duct, meeting MIL-H 8796A specifications, is now available from Flexible Tubing Corp., Guilford, Conn., in sizes from ½-inch to 12-inch inner diameter. In 1958, Specification MIL-H 8796A (Hose, Air Duct, Flexible, Aircraft) was rewritten by a committee composed of representatives of the Armed Forces, the duct manufacturers, and the aircraft industry. The specification became widely accepted as a realistic, practical basis for the use of this type of duct for conducting pressurized, heated, and refrigerated air in aircraft air-conditioning and anti-icing systems and in similar venting and exhaust systems.

To meet the exceptionally severe impermeability requirements of MIL-H 8796A, the neoprene coating of the fiber-glass base fabric of the duct was specially developed for this application by Vulcan Rubber Products Division, Reeves Brothers, Inc., New York, N. Y., working closely with Flexible Tubing's research, development, and test center.

The Flexflyte line of lightweight, reinforced fabric duct is intended for permanent and semi-permanent installations requiring optimum air flow efficiency. It can also be used for flow of liquids, gases, light solids, and chemicals.

The flexible tubing to meet MIL-H 8796A is now in regular production. It is mainly used for low-pressure venting and exhaust systems in aircraft and missiles. It is also suitable for industrial applications where extreme temperatures are encountered or where high impermeability of the duct is desirable, as in certain uses in metal processing plants and in chemical engineering.

Other requirements to be met included retention of flexibility at temperatures ranging from —65 to 300° F., operating pressure up to 40 psi. internally, non-inflammability, and resistance to abrasion, weather, and solvents. The neoprene-coated fiber-glass fabric remains fully flexible within this range. The material does not support combustion and is flame resistant.

The duct operates with working pressure of up to 40 psi. internally, 15 psi. externally. It can be installed without elbows or fittings at angles up to 180 degrees. Cuffed ends, sleeves, and clamps are available for making joints.

Goodyear To Increase Cushion Distribution

The Goodyear Tire & Rubber Co.'s foam products division, Akron, O., will increase its distributor and field service organizations for foam cushioning, according to D. K. Usher, manager of sales division-foam products. Usher, keynote speaker at a recent conference at Haddonfield, N. J., outlined a five-point program of action as follows.

Goodyear in 1960 will market new and improved Airfoam based on the company's new synthetic rubber latex Pliolite 5352—which will be competitive with all flexible foams. The firm will establish a new warehouse program for distributors. It will open a new company field operating service at Hickory, N. C., and establish a new sales territory in the Southwest, with district headquarters at Houston, Tex. The company also will increase substantially over 1959 advertising and sales promotion of foam products at all customer levels. Goodyear, moreover, will promote for selected applications its own polyurethane product —Pliofoam.

In stating Goodyear's new position on foam cushioning, Usher stated that the company will continue its aggressive program of research and development in all flexible foam fields. Goodyear's foam products division has as its objective the task of providing for the consuming public the best value in cushioning materials through the most efficient service.

NEWS BRIEFS

THE GENERAL TIRE & RUBBER CO., Akron, O., has announced a new compact winter tire for the 1960 compact cars. The new 13-inch tubeless winter tire, a fatter, shorter, lighter version of the company's regular-line Silent Safety Winter Cleat, can be used for either high-speed turnpike operation on dry pavement or for operation under heavy snow-slush conditions. The new tire utilizes a continuous tread design for long, quiet, easy-riding performance, coupled with deep, angled, siped cleats for traction through snow and mud and over wet or icy streets. The tire body is constructed with General's Nygen cord.

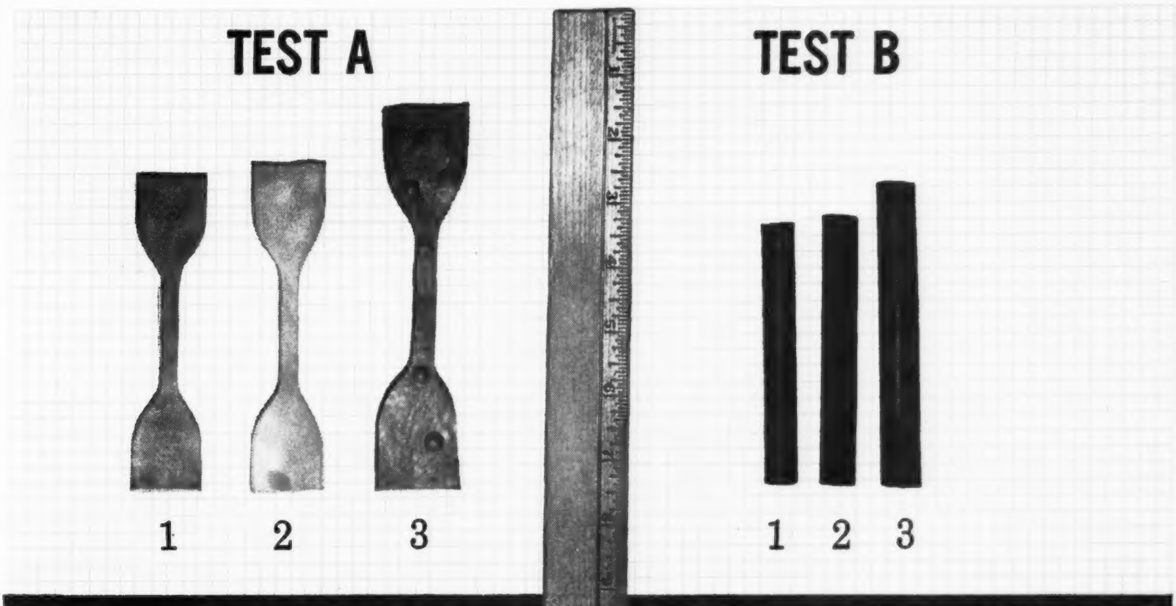
NAUGATUCK CHEMICAL DIVISION, United States Rubber Co., plans large-scale production of Flexzone 3-C antiozonant - antioxidant at its main plant in Naugatuck, Conn. Construction of a new unit to produce the chemical will be started this month with completion slated for the Fall of 1960, and operation scheduled to begin before the end of that year. Flexzone 3-C, N-isopropyl-N'-phenyl-p-phenylene diamine, minimizes cracking in tire sidewalls and treads by combating the effect of ozone and oxygen on tires.

MANHATTAN RUBBER DIVISION, Raybestos-Manhattan, Inc., Passaic, N. J., reports that a 1,864-foot length of its large diameter Condor flexible rubber pipe has been laid from the shore to the channel of the lower Delaware River for the purpose of discharging processing wastes from a large chemical plant in that area. In installing the pipe, successive 50-foot flanged lengths were bolted together, using corrosion-resistant bolts and nuts. The strength of the pipe is provided by a nylon and steel wire carcass. Covered with neoprene, the pipe-line is expected to last maintenance-free for the lifetime of the present waste disposal facilities.

TEXAS-U. S. CHEMICAL CO. has completed plans for an expansion of its research and development facilities in Parsippany, N. J. The main feature is a fully equipped, all-brick two-story building. The new laboratory will accommodate more than 150 persons and will provide additional space and facilities for research and development work, largely in the polymer and petrochemical fields. Sales technical service will also be expanded. Construction is slated to begin in May, 1960.

HERE'S PROOF Columbia-Southern

Silene® and Hi-Sil® white reinforcing pigments reduce water absorption



Nitrile Rubber Roll Compounds
Samples immersed in water 14 days at 158°F.
1. Compounded with Columbia-Southern Hi-Sil 233
2. Compounded with Columbia-Southern Silene EF
3. Compounded with a silico aluminate filler

Neoprene Wire Jacket Compounds
Samples immersed in water 28 days at 158°F.
1. Sample size before immersion
2. Compounded with Columbia-Southern Hi-Sil 233
3. Compounded with a sodium silico aluminate filler

In each of these recent tests, the samples compounded with Columbia-Southern fillers exhibited the least amount of water absorption. The pictures tell their own story—and prove the definite advantages of using Columbia-Southern Silene and Hi-Sil fillers.

Naturally, this reduced absorption makes for better end products. For example, household appliance parts formulated with Columbia-Southern pigments will retain dimensional stability longer. Adhesive bonds on cemented shoe soling won't lose strength as rapidly . . . and the soles themselves won't gain as much weight during wear. Cable jackets will remain sound without excessive swelling. Textile, paper, and steel mill rolls will have longer life at size specifications.

Get the details on these new findings. A full technical report has just been prepared, describing the comparative water absorption of a variety of rubber compounds, both natural and synthetic, and will be sent out to our regular mailing list immediately after publication. Use the coupon to get your copy if you do not regularly receive Columbia-Southern technical literature.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION
A Subsidiary of Pittsburgh Plate Glass Company

Columbia-Southern Chemical Corporation
Room 1929W, One Gateway Center
Pittsburgh 22, Pennsylvania

Please send me a copy of your report on water absorption in rubber compounds.

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News Briefs

MONSANTO CHEMICAL CO.'S plastics division, Springfield, Mass., plans to increase production of styrene monomer by at least 200 million pounds a year. The first stage of the new facilities, to be located in Texas, is expected to be in operation by the first quarter of 1961. Plans also include eight expansion projects throughout the division's styrene polymer plants at Springfield, Mass., Cincinnati, O., and Long Beach and Santa Clara, Calif. These projects are for the manufacture of new styrene-based materials resulting from the company's research programs in this field.

ANDERSON CHEMICAL CO., division of Stauffer Chemical Co., has brought on stream a new unit at Weston, Mich., for the commercial production of vanadium oxytrichloride. Output of the new facility, construction of which was completed in November, will be sold primarily as intermediates for the manufacture of catalysts to produce plastic and elastomeric polyolefins and for the synthesis of other organometallics. Suggested uses for the compounds include the preparation of stereospecific catalysts for the polymerization of olefins; as chlorinating agents; synthesis of vanadyl esters; solvent with low dielectric constant; and manufacture of vanadium steel. Technical bulletins giving more detailed information on the compounds are available from the manufacturer.

THE DAYTON RUBBER CO., Dayton, O., is now offering a compact, virtually fool-proof do-it-yourself kit for mixing urethane foam for home handymen, motor boat and yachting enthusiasts. The kit contains premixed chemical components capable of creating lightweight rigid urethane foam to fill areas as small as a cubic foot. The foam is extremely simple to prepare. A sealed can containing a premeasured chemical serves as the mixing container. The user combines and stirs the components in accordance with printed instructions included prior to pouring the mix into the mold or void. The material expands to 30 times its original volume within ten minutes. The resulting rigid foam clings to any surface and is said to have a natural buoyancy and great structural strength and rigidity.

STAUFFER CHEMICAL CO. will erect a new carbon bisulfide plant at Delaware City, Del., on property purchased from Tidewater Oil Co. Construction will commence shortly; completion is scheduled for November, 1960. The plant will use methane from Eastern Shore Natural Gas Co. and sulfur from Tidewater. The new petrochemical unit will use processes currently employed at Stauffer's bisulfide plant at LeMoyne, Ala.

A technician at the Firestone Steel Products Co., a subsidiary of The Firestone Tire & Rubber Co., Akron, O., uses an X-Y plotter to analyze the stress of a giant earthmover rim. Strain gages are cemented in the area to be tested, and the tire is inflated. The inflation pressure applies a load to the rim, and the stress developed by the load is recorded on the instrument panel which is shown at the left

LANDERS-SEGAL COLOR CO., Brooklyn, N. Y., has appointed T. H. Cushman Co., 339 Auburn St., Auburndale 66, Mass., its sales representative for New England. Landers-Segal also has named T. L. Peterson Co., 3049 E. Grand Blvd., Detroit 2, Mich., its sales representatives for Michigan. The two representing firms will have charge of the sales of Lansco dry colors, water dispersions, and flushed colors to the manufacturing industries. Price lists and technical data are now available at the office of these Landers-Segal representatives.

STAUFFER CHEMICAL CO. has completed plans to build a major research center at Richmond, Calif., located on a 10-acre tract adjacent to the firm's present plant and research laboratories. Construction of the first unit of the new center will begin in January, with completion of this initial laboratory scheduled for early 1961. Cost will be about \$1.6 million. The existing research facilities will be used to expand process development and pilot-plant activities. The central building of the new center will be of a wing-type design to facilitate future expansion and integration with other planned facilities. The center will include, initially, administrative offices, 20 laboratories for basic and applications research, library, and auditorium, units for bench-scale process development, and the usual service facilities.

HOOKER CHEMICAL CORP.'S board of directors has voted to establish corporate headquarters in New York, N. Y., according to Thomas E. Moffitt, president. The decision involves only some 15 to 20 people in certain corporate departments previously at Niagara Falls, N. Y. Hooker has rented the entire thirty-fourth floor of a new building at 666 Fifth Ave., New York. This will also accommodate the firm's New York district sales offices now in the Lincoln Building. The new offices should be ready for occupancy in late February or March, 1960.
Pelletized News

C. J. BERINGER CO., Chicago, Ill., Midwest sales representative for Davis-Standard, division of Franklin Research Corp., Mystic, Conn., will now cover Michigan in its sales territory. Beringer handles sales engineering for D-S Thermatic extruders and related machinery in Illinois, Minnesota, Wisconsin, Indiana, and Michigan. Beringer will service all accounts in this area exclusive of wire insulating business. John Wheeler, Jr., Davis-Standard sales engineer, will continue to service wire insulating accounts.

A. SCHULMAN, INC., Akron, O., has been appointed sales agent in the plastics injection molding and extrusion industries by AviSun Corp., which recently began commercial production of polypropylene polymer at Port Reading, N. J. The Schulman organization, one of the largest in the country, has long been a factor in the marketing of plastics material. It will provide nation-wide coverage for AviSun polypropylene. Technical service will be supplied by plastics technologists from AviSun.

THE DAYTON RUBBER CO.'S foam division, plans establishing a foam fabricating plant, warehousing and sales office in Chicago, Ill. The new facilities will contain 20,000 square feet and will be located at Anson Place and Janice Ave. in Melrose Park area. Operations are scheduled to begin about January 1. The division will be able to offer area furniture manufacturers the complete line of molded and fabricated Koolfoam cushioning and urethane foam products.

NATIONAL ASSOCIATION OF WASTE MATERIAL DEALERS, INC., has voted to change its name to National Association of Secondary Material Industries, Inc. (NASMI), effective June 1, 1960. The change of the name of the 46-year-old organization was adopted at the NAWMD fall meeting during the general membership session on November 12. Earlier this year the board of directors felt that the new name defines more clearly the nature of the association, which is composed of several secondary material industries.

NEWS about PEOPLE

Donald Rivin has joined the technical staff of the Cambridge research laboratories of Godfrey L. Cabot, Inc., Boston, Mass. Dr. Rivin starts as a research chemist in the fundamental research section of the carbon black technical department. Also, **Frank E. Daley** becomes development manager of the company's minerals and chemicals division, to coordinate the ceramic, metallurgical, and other inorganic development programs for products of this division. He will be responsible for the quality of materials for these fields, will participate in developing new uses of the division's products, particularly for the ceramic and metallurgical industries, and will aid in bringing other new products into this division. His offices will be at Cabot's home office in Boston. **William F. Slade** has transferred from the Boston office to Cleveland, O., as salesman for this division. He will cover Michigan, Ohio, and western Pennsylvania and will give technical service to the company's agents in Detroit, Cleveland, Pittsburgh, Buffalo, and Cincinnati areas.

Clarence F. Fleischner has been named general sales manager for the Warwick wax division of Western Petrochemical Corp., New York, N. Y. Prior to this he was supply sales manager for the Pure-Pak Division of Ex-Cell-O Corp.

D. E. McIntire has joined the sales staff of Dill Mfg. Co., Cleveland, O. Previously McIntire was with The B. F. Goodrich Co., Akron, O.

Frederick J. Pichard has been appointed assistant director of marketing, and **Donald A. Swardson,** manager of abrasive and Long-Lyfe parts sales at Wheelabrator Corp., Mishawaka, Ind. Pichard's responsibility will be to develop special marketing programs in keeping with the company's plans for expansion. His previous position was manager of standard equipment sales. Swardson will be responsible for the development and execution of promotional programs on abrasive and Long-Lyfe parts and for the support of the abrasive sales force in the field. He served as abrasive specialist in the Mishawaka office for the last two years.

Richard P. Tarbox has been named assistant sales manager, chemical sales, for the plastics and coal chemicals division, Allied Chemical Corp., New York, N. Y. His primary responsibility will be for sales of tar acids, tar bases, and phenols, synthetic and natural. He has been with the company since 1948.

Ralph Heckman has been named vice president in charge of advertising research and planning for the Gates Rubber Co., Denver, Colo. The board of management created the post especially for Heckman, who has been vice president and advertising director since 1934. **Robert E. Holwell** succeeds Heckman as administrative director of the advertising department. Holwell has served in sales, engineering, and research with the company in the last ten years. **Charles J. Korsoski,** a Gates vice president, becomes head of the "private brands" sales division. Previously he had been in charge of all automotive jobber and hardware sales. **Drexel D. Minshall** succeeds him as head of the automotive jobber and hardware sales division. B. C. Emerson, who was in the industrial marketing department, is now sales manager of the Gates " private brand" tire sales department.

Victor L. Toft, executive vice president of Sidles Co., Omaha, Neb., has been named Automotive Man of the Year by the Automotive Service Industry Association. Toft, whose firm is a wholesale distributor of automotive parts, appliances, and Seiberling tires, was selected by representatives of several automotive trade magazines.

Paul V. Brown is now coordinator of roller production for the Dayton Industrial Products Co., division of Dayton Rubber Co., Dayton, O. He will take charge of specialized roller production for the graphic arts and industrial roller fields in the firm's Dayco division.

John W. Martin has been appointed project manager of the commercial development department of Pittsburgh Coke & Chemical Co., Pittsburgh, Pa. In his new position he will analyze and coordinate various chemical projects with respect to their business potential.

George Menkes, sales manager for the past four years, has been elected vice president of Testing Machines, Inc., Mineola, L. I., N. Y. Before joining Testing Machines he had been associated with the United Motor division of General Motors Corp.

Robert E. Pierson is now commodity manager of the transportation products department of the footwear and general products division of United States Rubber Co., New York, N. Y. Pierson joined the company in 1948 and has held various engineering and sales positions.

Donald R. Wright has been named West Coast manager of retread rubber sales for The General Tire & Rubber Co., Akron, O., succeeding **Earl Schaub,** recently appointed Los Angeles division manager. With headquarters at General's new retread rubber plant and offices in City of Industry, Calif., Wright will be responsible for retread rubber sales in the 13-state western region.

Leo Miller has been named southern regional industrial sales manager for Dayton Industrial Products Co., a division of Dayton Rubber Co. He will handle sales in the southeastern United States from the company's new Atlanta, Ga., warehouse.

Eugene N. Beesley, president and a director of Eli Lilly & Co., has been elected to the directorate of United States Rubber Co., New York, N. Y. He is also a director of many other organizations.

Jack A. Bush has been made manager of sales engineering for oil seals with the Yale Rubber Mfg. Co., Sandusky, Mich., according to **E. H. Henderson,** president and general manager. Bush will be responsible for sales application engineering and service for oil seals.

Charles G. Turner, Jr., has been appointed purchasing agent for O'Sullivan Rubber Corp., Winchester, Va. He has been with O'Sullivan since 1955, where he has held the positions of senior accountant, advertising manager, and public relations manager. He replaces **William O. Grove**, who has resigned.

Mrs. Jane Bishop is now supervisor of advertising services for Beckman Instruments, Inc., Fullerton, Calif. Mrs. Bishop, who has served as advertising production assistant for Beckman's Helipot division, will be responsible for providing art, production, and traffic services for the company's corporate and division advertising departments.

News about People

J. George Grimm has been elected vice president in charge of sales for Stewart Bolling & Co., Inc., Cleveland, O. Grimm, with Bolling for 15 years, moves up from general sales manager.

Gordon R. Lichtwardt has been appointed advertising manager of The General Tire & Rubber Co., Akron, O. His job will be to direct and coordinate the corporation's advertising and sales promotion program. He was previously passenger tire sales manager of the Charlotte, N. C. division.

C. P. Pesek, vice president for engineering and staff manufacturing of Minnesota Mining & Mfg. Co., St. Paul, Minn., has been elected to the company's board of directors and to the executive committee. Pesek, who has directed the firm's building program, is also director of several 3M subsidiaries, coordinator of missile industry activities, and staff officer in charge of the reinforced plastics division.

A. M. Eggeman has joined Witco Chemical Co., New York, N. Y., as assistant director of purchases. His previous experience in purchasing includes 13 years with the Rexall Drug Co. Witco produces and markets a wide variety of chemicals for industrial and specialty uses.

Joseph P. Palumbo has been appointed manager of the plastics industry division of Nuodex Products Co., division of Heyden Newport Chemical Corp., Elizabeth, N. J., and will administer the entire plastics industry line. Palumbo was formerly product sales manager for organic peroxide catalysts and accelerators.

J. C. Welch has been appointed executive vice president in charge of sales for Rawls Bros. Co., Inc., Lima, O., according to **Vaughn Rawls,** president. Welch, who has been general sales manager for the past year, will continue to administer the sales program in addition to his new duties as executive vice president.

Richard H. Hugger has been appointed senior department manager of United States Rubber Co.'s research center at Wayne, N. J. Hugger started with the company in 1947 in the mechanical engineering research department, rising to the position of department manager in April, 1958.

J. A. MacIntire, Jr., is now general sales manager of Republic Rubber Division of Lee Rubber & Tire Corp., Youngstown, O. Formerly manager of wire braid hose sales, he has been with the Division since June, 1953.

B. P. Cooper W. R. Peterson

Benjamin P. Cooper has been named sales manager for Firestone International Co., Akron, O., according to **W. D. Waugh,** president. Cooper, who recently returned from the company's plant in Venezuela, where he was sales manager, succeeds **Frank B. Norton,** now manager of the United States Trading Co. in Monrovia, Liberia.

William Dalton, president of Tyrex, Inc., New York, N. Y., has been elected to the board of directors of the association which represents manufacturers of the new Tyrex viscose cord.

Albert W. Meyer will direct the college and university relations program and technical recruiting for United States Rubber Co.'s research center at Wayne, N. J. Dr. Meyer, who has been leader of radiation research with the company for the last two years, will visit colleges and universities to encourage students to choose careers with U. S. Rubber.

Stewart B. Steiner has joined the public relations department at The Firestone Tire & Rubber Co., Akron, O. Formerly a technical writer and a group leader in the company's defense research division, Steiner will specialize in the preparation of technical articles and material for communication media.

Roy A. Parker has been named Kansas City sales division manager for U. S. Industrial Chemicals Co., Division of National Distillers & Chemical Corp. His previous position with the company was manager of the Kansas City, Mo., sales office. **Joseph G. Longstreth** becomes manager of the St. Louis, Mo., sales office. He has been a sales representative in the St. Louis area since 1955.

Warren A. Brown is now president of the Florence Pipe Foundry & Machine Co., Florence, N. J., and of the R. D. Wood Co., Philadelphia, Pa., succeeding **E. Roy Russell,** retired. Brown was vice president of the Florence company since 1954. Russell will continue to be available to both companies in an advisory and consulting capacity.

William R. Peterson has been named supervisor of polymer research for United Carbon Co. and will be stationed at the Baytown, Tex., laboratory of United Rubber & Chemicals Co., a subsidiary. Dr. Peterson will direct exploration on current styrene-butadiene polymers for the rubber tire and mechanical goods industries. He was formerly senior research chemist with Continental Can Co. and before that assignment spent five years as a research chemist with du Pont.

Frederick Knight is now chemical buyer for Marbon Chemical Division, Borg-Warner Corp., Washington, W. Va. He formerly was purchasing agent for Darling & Co., Chicago, Ill.

Thomas D. Lewis, Jr., has been promoted to assistant sales manager of the tire cord—industrial products division of Industrial Rayon Corp., Cleveland, O. Lewis, who joined the company as a chemist in 1949, recently held the position of salesman.

Edward M. Bevilacqua has been named senior research scientist at the Research Center of United States Rubber Co., Wayne, N. J. Dr. Bevilacqua, a member of the staff of the synthetic rubber research department, now studying problems related to deterioration of rubber during use, has been with the company since 1944.

William G. Burket has been named chief engineer of truck tire design for The Goodyear Tire & Rubber Co., Akron, O., replacing **J. E. McCarty.** Burket was assistant to McCarty when the latter retired October 1. Burket served 17 years in technical positions in the rubber industry before joining the development staff of Goodyear International Corp. in 1956.

Robert A. Johnston has been made research project leader in materials application research for Evans Research & Development Corp., New York, N.Y. He has had experience with the utilization of polymeric materials, particularly coatings, textiles, and plastics. Previously Johnston was with E. I. du Pont de Nemours & Co., Inc.

Wesley E. Gatewood is now director of field sales for the Barrett Division, Allied Chemical Corp., New York, N. Y. He joined Barrett in February as director of sales training and promotion after 12 years with Armstrong Cork Co., most recently as assistant sales manager of the Philadelphia district.

William Butler, III, has been made administrative assistant to **James F. Connaughton,** president of Wheelabrator Corp., Mishawaka, Ind. Butler previously held various executive positions at Lukens Steel Co.

News about People

R. H. Jackson H. A. Bourne

Randolph H. Jackson has been appointed vice president in charge of sales, and **Harry A. Bourne,** vice president in charge of manufacturing, for the Boston Woven Hose & Rubber Division, American Biltrite Rubber Co., Cambridge, Mass. Both are new positions in the organization. Jackson was director of sales for the past three years, and Bourne, factory manager for the past two years.

James R. Tully has been made field sales manager for U.S. tires, according to **Gerald W. Brooks,** director of marketing for the tire division of United States Rubber Co., New York, N. Y. Tully was formerly assistant general sales manager for U.S. tires. This post has been discontinued in an expansion of the field sales organization designed to provide better sales service to the firm's tire dealers in today's rapidly growing market.

Henry S. Richard, William R. McCrary, and **Clark E. Stair** have received new appointments with the racing division of Firestone Tire & Rubber Co., Akron, O., according to President **Raymond C. Firestone.** Richard becomes director of racing, in which capacity he will direct and coordinate all phases of Firestone's automobile racing activities in the U. S. and all foreign countries where Firestone tires are used. McCrary is now general sales manager of race tires. His previous position was that of service division manager in the company's Indianapolis racing division headquarters. Stair has been named manager of race tire development. Formerly he was assigned to truck tire engineering.

John A. Putnam is now manager of the Atlanta, Ga., office of U. S. Industrial Chemicals Co., division of National Distillers & Chemical Corp. He has been with the company since 1952 in a sales capacity.

Lawrence S. Pricher has been elected a vice president of The New Jersey Zinc Co., New York, N. Y. His duties will involve chiefly financial matters. Formerly Pricher was vice president (finance) of the Foster-Wheeler Corp.

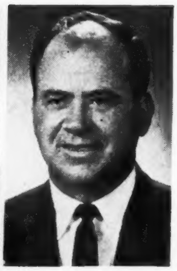
Vern R. Thomson has been appointed sales promotion supervisor for the Ontario district for The McArthur Chemical Co. (1958), Ltd., Montreal, P.Q., Canada, reporting to **H. Magnussen,** district sales manager. Thomson joined McArthur Chemical three years ago as sales representative after spending several years with the Ontario Research Foundation and with Dominion Tar & Chemical. In addition to his new duties, he will continue to service the oil and rubber industries in the Toronto area.

W. C. Franklin has been named manager of the polychemicals department of Texas Butadiene & Chemical Corp., New York, N. Y., a new division which will be responsible for application research, market development, and sales of a new series of polymers, copolymers, and other polychemicals. Previously Franklin was assistant sales manager. **R. M. McFarland** has joined the company as manager of market development with a first assignment in the polychemicals department. He formerly was with Food Machinery & Chemical Corp. in a market development capacity. **J. C. French** has joined the market research department of Texas Butadiene, in charge of this function for the polychemicals department. He was formerly with the market research department of American Cyanamid Co., Bound Brook, N. J.

John L. Shortley becomes manager of the patent department of Hewitt-Robins, Inc., Stamford Conn. He will be responsible to **Robert R. Allen,** director of engineering, research, and development. A graduate of the law school of Georgetown University, Shortley was a patent examiner in the United States Patent Office. Since 1951, he was associated with the Washington office of the patent law firm of Munn, Liddy, Daniels & March, the last two years as manager of the office.

Stuart N. Davidson has been appointed corporate contracts administrator for Beckman Instruments, Inc., Fullerton, Calif. He will administer certain government contracts and subcontracts for the corporation as a whole and will prescribe contract administration procedures for the individual divisions and domestic subsidiaries.

Clarence H. Mingle has been elevated to executive vice president in charge of marketing at the Gates Rubber Co., Denver, Colo., according to **Charles C. Gates, Sr.,** president, who announced the newly created office. Mingle, who was formerly vice president (since June 1, 1944) and director of marketing, will be responsible for the coordination and direction of all Gates sales divisions. He has been with the company since June 27, 1923.



Peggy Todd

V. R. Thomson C. J. Ford

Charles J. Ford is now sales manager of Ensolite products for the footwear and general products division of United States Rubber Co., New York, N. Y. He was formerly sales manager of products in development. Ensolite is a closed-cell vinyl sponge material with great capacity to absorb shock.

William C. Wiley, William G. Paul, C. John Ebbrecht, Wallace E. Riffelmacher, and Raymond C. Wolfert have joined the staff of Harchem Division, Wallace Tiernan Inc., Bellville, N. J. Wiley, appointed product development manager, has had 18 years' experience in the fields of polymers and chemicals. Paul is representative for fatty acids in the Illinois, Missouri, Wisconsin area, and Ebbrecht in the New England, New York State area. Riffelmacher is now sales representative for chemicals and plasticizers in New York and New England. Wolfert will be sales representative for Harchem Plasticizers in the Midwest.

Rodney H. Morrison has been appointed sales engineer for Davis-Standard Division of Franklin Research Corp., Mystic, Conn. He will deal with Davis-Standard thermatic extruders for thermoplastic and rubber and accessory equipment. His sales territory includes Long Island, metropolitan New York, New Jersey, Pennsylvania, Delaware, Maryland, the Virginias, and the Carolinas.

Raymond H. Blanchard, president of the B. F. Goodrich Footwear & Flooring Co., Watertown, Mass., has been installed as the twenty-fourth president of the Associated Industries of Mass., succeeding Robert W. Stoddard, president of the Wyman-Gordon Co., Worcester, Mass. Blanchard has been president of Goodrich Footwear for the past nine years and has been with the company since 1917.

William R. Whitaker has been appointed to the sales management team of Advance Solvents & Chemical Division of Carlisle Chemical Works, New Brunswick, N. J. He was formerly eastern sales supervisor for Carlisle Chemical Works, Reading, O.

OBITUARIES

Luther B. Martin

Luther B. Martin, for many years director of tire development of the United States Rubber Co., died October 19 in Detroit, Mich.

He joined the rubber company at a tire plant in Hartford, Conn., in 1918 as a chemist and eventually became factory manager. When this plant closed, Martin transferred to the development department, tire division, Detroit plant in 1930. He became assistant director of development in 1940; director of development, 1945; and technical director for tire development, 1947. He retired in 1948 because of poor health and had been living in Detroit, Connecticut, and Florida.

He was active during the war in the Government Rubber Program as a consultant from United States Rubber in connection with the manufacture of synthetic rubber tires. Mr. Martin was also a pioneer in the manufacture of pneumatic tires by virtue of his long association with that industry, starting in 1918 at the Hartford plant.

Mr. Martin was born in Allendale, S. C., July 28, 1885.

Surviving are his wife, a son, and two daughters. Interment took place at Mt. Olivet Cemetery in Detroit.

Budd E. Pollak

Budd E. Pollak, president of Gavitt Wire & Cable Co., a division of Amerace Corp., New York, N. Y., died on October 18 from a cerebral hemorrhage.

Mr. Pollak, who was born on July 11, 1909, attended St. Paul's High School in Concord, N. H., and was graduated from Harvard University in 1932.

He was employed by American Hard Rubber Co., New York, in March, 1946, as a senior engineer. Subsequently, he became staff executive engineer and in 1949, secretary of the company. In January, 1957, he was named executive vice president and general manager of Pequanoc Rubber Co., then a subsidiary of American Hard Rubber Co. In December, 1957, Mr. Pollak was appointed president of Gavitt Wire & Cable Co.

Services were held at Sessions Funeral Home, Worcester, Mass., and burial took place on October 21 at Pine Grove Cemetery, Spencer, Mass.

The deceased is survived by his wife, his mother, a son, a daughter, a brother, and a sister.

Alfred W. Hanmer

Alfred W. Hanmer, 55, of Buffalo, N. Y., died suddenly on November 10 in New York, N. Y., following an operation.

Associated with the plastics industry for the past 33 years, Mr. Hanmer, at his death, held the position of sales manager of the Durez Plastics Division, Hooker Chemical Corp., having been appointed in 1955 when Durez Plastics & Chemicals, Inc., was merged into Hooker. He started with Durez in 1929 as a sales engineer, advancing to sales manager and later vice president of molding compound sales. From 1945 to 1955, Mr. Hanmer was a vice president of Durez.

During World War II, Mr. Hanmer was an active member of several committees of the National Production Authority as well as the Office of Price Stabilization.

Born in Wethersfield, Conn., on June 17, 1904, Mr. Hanmer attended elementary and secondary schools there, continuing his education at Wilbraham Academy. In 1922 he enrolled at the University of Maine where, in 1926, he received a B.S. degree in chemical engineering.

A member of Plastics Pioneers, Mr. Hanmer was a director of the Society of Plastics Industry and a member of the plastics committee of the Manufacturing Chemists' Association. He also belonged to the National Sales Executives, Chemists' Club, New York, N. Y., the University Club of Hartford, and the Saturn Club and the Country Club of Buffalo.

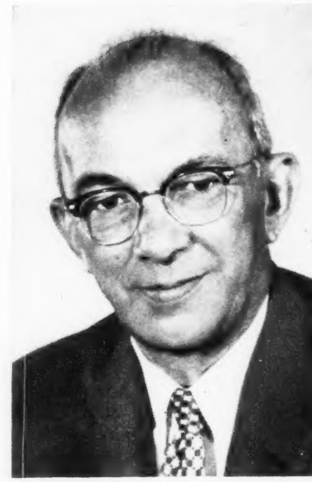
Mr. Hanmer leaves his wife, a daughter, two granddaughters, two sisters, and a brother.

Services were held on November 14 at the Christ Chapel, Trinity Episcopal Church, Buffalo, N. Y.

Thomas B. Crowell

Thomas B. Crowell, executive vice president of Copolymer Rubber & Chemical Corp., Baton Rouge, La., died on November 2 at his home in Baton Rouge following a lengthy illness.

Mr. Crowell was born in Cleveland, O., on March 16, 1908. Early in his life his family moved to Canandaigua, N. Y., where he attended elementary and high school. He received his B.S. in chemical engineering from Clarkson College of Technology in 1929.



Thomas B. Crowell

Mr. Crowell had been associated with Copolymer since May, 1943. He served in many capacities with Copolymer, including shift supervisor, assistant chief engineer, production superintendent, production manager, and vice president and general manager. He was named executive vice president on July 1, 1958.

Before joining Copolymer in 1943 he had been employed by the American Cyanamid Co., Linden, N. J.

Crowell was a director of the Baton Rouge Chamber of Commerce and a member of the Baton Rouge Rotary and the City Clubs.

Mr. Crowell leaves his wife, three daughters, a son, a sister, and a nephew.

Floyd C. Snyder

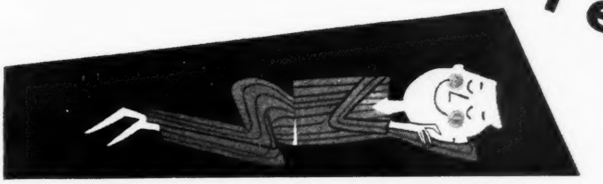
Floyd C. Snyder, 77, chairman of the board of Ace Rubber Products, Inc., Akron, O., passed away on October 28. Mr. Snyder, an active leader in the rubber industry for many years, had headed Ace since its founding, in 1935, and had been president of its predecessor, American Rubber & Tire Co. At the time of his death he was also president of American Storage & Transfer Co., Akron.

Mr. Snyder, a native of Massillon, O., was a graduate of Cornell University, Class of 1905, where he received degrees in mechanical engineering and electrical engineering. He led a long and successful business career and had served as chief executive or a director of a number of Ohio concerns.

He was also a prominent Mason and had headed numerous civic organizations in Akron and Massillon.

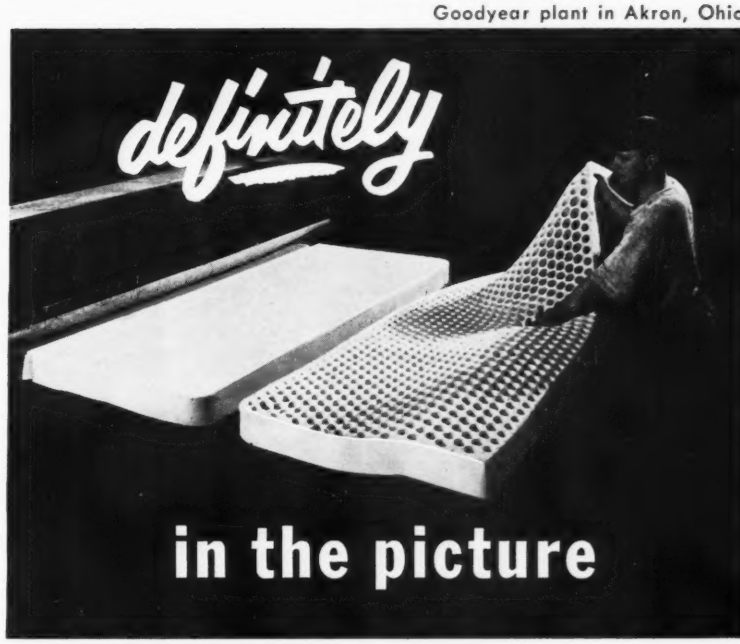
Just over a year ago, Mr. Snyder relinquished the presidency of Ace Rubber Products, Inc., to his son, Charles J. Snyder, who had been executive vice president for several years.

People Sleep Better



because ZnO is

Airfoam ® Mattress Core at Goodyear plant in Akron, Ohio.



Zinc Oxide performs innumerable duties: As a pigment in paint it imparts to the coatings such important properties as tint retention, toughness and durability. As a constituent of glass, glazes and enamels, zinc oxide imparts fluxing power, higher gloss, elasticity and lower expansion with increase in temperature. In the manufacture of rubber products, ZnO assists the cure of compounds based on either natural or synthetic rubber; it contributes reinforcement to many products and – but what's the use of enumerating its manifold functions in this particular field – readers of this publication *know* what they are.

AIRFOAM: ® The Goodyear Tire & Rubber Company

LEAD-FREE ST. JOE ZINC OXIDE

To the consumer it all boils down to one vital question: Who shall be my number ONE supplier of zinc oxides?

If the ability to provide the precise grade you require—shipment after shipment—is vitally important to you, St. Joe's unique method of high-speed continuous quantitative analysis is your guarantee of consistent grade uniformity. By means of St. Joe's recently installed Baird-Atomic Direct Reading Spectrometer, analysis time has been reduced from the usual 6 to 8 hour interim, *to less than 20 minutes.* This means that once you have selected the specific grade of St. Joe ZnO that meets your requirements, you can set your processing—OUR OXIDE WILL NOT CHANGE.

And, what's all the above got to do with Airfoam ® Mattresses, made by Goodyear? Well, people sleep better because ZnO is definitely in the picture—and rubber technologists know how to utilize its advantageous properties.

ST. JOSEPH LEAD CO.

250 Park Avenue, New York 17, N. Y.

ST. JOE

The Largest Producers of Lead in the United States, and a Leading Producer of Slab Zinc and Zinc Oxides

ZNO-140

Obituaries

Harry E. Smith

Harry E. Smith, retired vice president of Raybestos-Manhattan, Inc., in charge of rubber product sales, died November 2 at the age of 70 in Sarasota, Fla.

Mr. Smith was born in Massachusetts and moved to Passaic, N. J., at the age of eight. He joined The Manhattan Mfg. Rubber Co. there in 1909 as a clerk. By the time of the merger of Raybestos and Manhattan with other plants in 1929, Mr. Smith was Manhattan's sales manager. He later became general manager of the Manhattan Division plant in 1942 and vice president of Raybestos-Manhattan in 1944. In 1946 the deceased was made vice president in charge of rubber sales for the corporation, with headquarters at Passaic. He served as director and member of the executive committee of the company from 1941 until his retirement in 1954.

Mr. Smith was formerly president of the Passaic Chamber of Commerce and of the Upper Montclair Country Club, a member of the board of governors of Passaic General Hospital, of the board of The Rubber Manufacturers Association, Inc., and of the Rubber Advisory Panel to the State Department. In that capacity he attended an International Rubber Conference in England during World War II. During his administration as general manager during the war, the Manhattan Division instituted numerous employe programs such as Servicemen, Pioneers, Victory Gardens, and received highest area awards in War Bond sales, Red Cross, Save Rubber and Scrap Drives and others.

Mr. Smith leaves his wife and one son.

James O'C. Brown

James O'C. Brown, 62, vice president of Petro-Tex Chemical Corp., Houston, Tex., and a veteran of more than 43 years in the petroleum and rubber industries, passed away in Houston, October 2, after a prolonged illness.

Mr. Brown joined Sinclair Refining Co. in 1916 at its Mereaux, La., refinery and advanced through various operating levels to become superintendent of the Lube Oils division of the Sinclair refinery at Houston in 1923. In July, 1942, at the outset of the GR-S program, he was chosen as general superintendent of Sinclair Rubber, Inc., created to operate the government-owned butadiene plant at Houston.

Responsible in great degree for the successful operation of that plant from 1944, Brown was named manager in 1950, continuing in that capacity after the acquisition of the Sinclair butadiene facility from the government by Petro-Tex. He was elected a vice president of Petro-Tex in October, 1956.

Charles R. Conklin

Charles Russell Conklin, 63, of Youngstown, O., general sales manager of Republic Rubber Division, Lee Rubber & Tire Corp., died in his sleep on November 3 while visiting in Chicago, Ill. Mr. Conklin, with Mrs. Conklin, was attending the annual meeting of the Central States Industrial Distributors' Association.

He was born January 19, 1896, in Prospect Park, Pa., and went through local schools and studied mechanical engineering at Drexel Institute in Philadelphia.

The deceased served with the United States Navy during World War I. He next was a salesman with United States Rubber Co. and with Crandall Packing Co. until he joined Republic Rubber Division on August 16, 1926, as a salesman in the Philadelphia and Baltimore areas. During World War II, he was stationed in Washington, D. C., as a special representative. After the war, Mr. Conklin was appointed eastern district manager, with headquarters in Philadelphia, Pa., and on March 1, 1959, transferred to Youngstown, O., as assistant general manager. On July 1, 1959, he was appointed general sales manager.

He was a member of the Carmel Presbyterian Church, Glenside, Pa.; the Boumi Temple Shrine of Baltimore; Lulu Temple Country Club, Philadelphia; Lehigh Valley Club, Allentown; Washington Rubber Group; Youngstown Club; and The Youngstown Country Club.

Funeral services were held on November 6, in Baltimore, Md., followed by interment in Woodlawn Cemetery there.

Survivors include the widow, a daughter, a son, five grandchildren, and four sisters.

Roland Reppert

Roland Reppert, vice president-marketing, American Hard Rubber Co., New York, N. Y., succumbed on September 27 to a brain tumor.

Born on May 15, 1897, Mr. Reppert attended Morris High School and New York University, both in New York, and Officers Training School, United States Navy Pay Corps, and the Berlitz School of Languages.

Mr. Reppert was employed by American Hard Rubber Co. on August 23, 1915. On January 29, 1945, he became an industrial products salesman. In March, 1947, he was named vice president-sales and subsequently became vice president-marketing.

Funeral services were held on September 29 at the George T. Davis Memorial Chapel, New Rochelle, N. Y. Interment occurred the following day.

Survivors include his wife, two daughters, and two sisters.

Walter J. Murphy

Walter J. Murphy, 60, editorial director of the American Chemical Society's applied journals, died November 26 in a Georgetown hospital.

Dr. Murphy received his B.S. in Chemistry from the Brooklyn Polytechnic Institute in 1921. He was awarded an honorary Doctor of Science from Centre College of Kentucky.

He was associated with Air Reduction Co., American Cyanamid Co., and United States Rubber Co. In the late Twenties he was appointed vice president of George Chemical Co. and in 1928 became sales assistant to the president of the Mutual Chemical Co. of America.

Dr. Murphy entered the editorial field in 1930 as managing editor of *Chemical Markets*, now *Chemical Industries*. The ACS made him editor of *Chemical and Engineering News* and *Industrial and Engineering Chemistry* in 1942. He was appointed editorial director in 1955.

The deceased belonged to, among others, ACS, Society Industrielle and Société de Chimie Industrielle (American Section), American Institute of Chemical Engineers, the Washington Academy of Sciences, the New York Academy of Sciences, Sigma Xi, Alpha Chi Sigma, Pi Kappa Phi, and the Cosmos, National Press, University, Torch, and Congressional Country clubs of Washington, and the Chemists Club in New York; was a Fellow and an honorary member of the American Institute of Chemists; and a Fellow of the American Association for the Advancement of Science.

He is survived by his wife, a daughter, a son, and three grandchildren.

A Requiem Mass was offered at St. Michael's Church, Silver Spring, Md., on November 30, followed by burial in Gate of Heaven Cemetery.

Robert P. Gardner

Robert P. Gardner, 38-year-old vice president and general manager of the Goodyear International Corp.'s Pathfinder Rubber Estate operations in the Philippine Islands, died unexpectedly on November 11 while in Manila.

A native of Woodlawn, N. Y., Gardner became associated with Goodyear in 1943 as a foreign service trainee in Akron, O., following graduation from the New Hampshire University. Two years later he was assigned as a staffman for Goodyear-India.

In 1948, the deceased was transferred to Singapore as office manager of the Goodyear Rubber Plantations Co., later becoming manager of operations in Malaya and Singapore. He was appointed vice president and general manager of the Philippine operations this year.

Gardner is survived by his wife, two sons, a sister, and a brother.

NEWS from ABROAD

Malayan Rubber Plans Presented to Board

Details have been made public of the plans to strengthen the position of Malaya's rubber industry, which were presented to a special meeting of the Malayan Rubber Fund Board by the Controller of Rubber Research. Sir Geoffrey Clay, who recently returned from tours in Britain and America. These plans cover research work to increase productivity, reorganization and streamlining of research, and establishment of technical advisory service for consumers.

In connection with productivity work, Sir Geoffrey is quoted as stating that Imperial Chemical Industries, Ltd., which has been studying the sugar cane industry in the West Indies and sees possibilities of successfully applying some of the techniques of that industry to rubber growing, has offered to send an expert to Malaya to study local rubber industry problems and eventually to start a suitable program. The Malayan Rubber Fund Board is in favor of such a study, but a decision apparently depends on government approval of recommendations to reorganize the bodies which finance the Fund.

Government approval is also awaited on proposals for the control of research units in Britain and the coordination of research and development in Britain and Malaya. The Rubber Research Institute may arrange a conference in 1960 of directors of research organizations to discuss their problems.

Because American interest has tended to concentrate on synthetic rubber for use in road making materials, it is intended to discontinue promotion of natural rubber for roads in America, thus releasing funds (about $80,000 U. S. annually) for a technical advisory service. The work on natural rubber in paving materials will go on in Malaya, Australia, South Africa, and wherever synthetic rubber has not yet a firm foothold.

A technical advisory service in the United States, it is thought, would require five men. Their task would include acquainting small firms with the advantages of special rubbers such as SP (Superior Processing) and TC (Technically Classified) rubbers. It is hoped to be able to have a service operating in the United States by early 1960, and eventually a full technical advisory service also in Malaya.

Recognizing the need of a market survey, the Malayan Rubber Fund Board has appointed a committee, headed by Sir Geoffrey, to study the problems and costs involved in sending a rubber mission abroad, particularly to small countries which depend on natural rubber.

Since it has been suggested that the establishment of the Malayan Rubber Fund Board dispenses with the need of an intervening body such as the board of management of the Rubber Research Institute, the future of that Institute has been considered. The feeling seems to be that the director of the RRI should be assisted by a general-purpose advisory committee to deal with administrative matters, as well as a strong local research advisory committee; the latter would go into scientific needs of the industry and assess the research program accordingly. Sir Geoffrey, who favors more private research, suggested that this committee could also screen problems that should be dealt with by the Institute from those that might better be handled by private research.

Realization of Sir Geoffrey's proposals would require an increase of more than 20% in annual expenditure for research, it is understood.

Malayan Exports High

Malayan rubber exports over the first nine months of 1959 reached the all-time high of 887,817 tons. A breakdown of the distribution among the six best customers for the period reveals that Russia, which received more than 15% of the total, headed the list, and furthermore, that all except Britain increased their purchases. The following table gives the quantities and percentage differences against 1958 figures:

	Tons	Percentage
Russia	135,487	+547
United States	129,894	+ 56.7
Britain	120,207	— 21
Japan	89,611	+ 12.4
West Germany	59,638	+ 2.1
France	48,735	+ 19

China cut her purchases of Malayan rubber over the period under review to 19,084 tons, a drop of 70% against purchases during the first nine months of 1958.

Besides the record shipments of rubber, Malaya also exported 94,107 tons of latex during the first nine months of 1959, compared with about 115,100 tons for the whole of 1958. The four best customers for latex increased their off-take: the United States bought 24,922 tons, 18½% more; Britain, 24,347 tons, 10½% more; West Germany, 9,380 tons, 13½% more. The big surprise was Japan's share, which at 11,452 tons was an increase of 59%.

Total imports for the period came to 336,248 tons, up 11.7%.

Production for the first nine months of 1959 totaled 507,753 tons, or 5½% over the total for the corresponding period in 1958. The improved prices seem to be bringing out more smallholder rubber.

As we were going to press, figures were received on the ten-month total of rubber exports from Malaya. Total shipments amounted to 997,063 tons. October shipments of 109,246 tons were added to the 887,817 tons reported above for the nine-month period.

Rubber Market Decline Fails To Materialize

Events during the past few weeks have upset most predictions, favorable or not, about the probable effect of stockpile disposal. There has been no sharp recession in prices; the release of stocks has not relieved the shortage of high-grade sheet and spot rubber; the zeal for replanting, stirred up with so much effort among smallholders—which it was hoped an expected drop in prices would keep alive—has evaporated for the most part, and smallholders are tapping away, with little thought for replanting; and price levels, instead of being completely in the hands of London and Washington, as was feared would be the case, still tended to soar freely in the first week of November.

When it became evident that stockpile rubber was not coming on the market in either the quantity or quality feared by some and desired by others, those consumers and dealers who had held back awaiting lower prices were forced to rush to cover their needs. Since Communist China was at this time again in the market for No. 1 sheet—it is understood that she bought 15,000 tons for November shipment—a mad scramble resulted. Such excitement has not been seen on the Singapore market in years, and the prices jumped—erratically to be sure—but tending upward. The highest price for first grade was $1.29½ (Straits), with a premium of four cents (Straits) for spot rubber, reached on November 4.

Before the big upswing in price, some

criticism was heard about American stock disposal plans, which were compared—to the American disadvantage —with the British plan, the implication being that America, at least, was not concerned about possible adverse results for the producer.

The *Financial Times* expects the "squeeze" for immediate rubber to continue till early 1960.

Incidentally, heavy rains in many parts of Malaya may cause a big drop in November outputs of rubber on estates. Some planters figure the reduction might amount to 20-25% of the quantity they normally harvest for the month. The rains also mean fewer working days, hence less pay for labor, unless afternoon tapping becomes widespread on those days when it is found to be too rainy to tap the trees in the morning.

Organic Fillers Tried

Compounds of rubber and organic fillers frequently show mechanical properties comparable with those of rubber-carbon black vulcanizates; the best results are being obtained with latex.

To find a market, such compounds should be reasonably priced, hence be prepared where the latex is produced, to avoid costs of centrifugation, warehousing, freights, etc. For the same reason, the fillers should be products available locally. To test the usefulness of various raw materials rich in nitrogenous substances, and easily obtained in or near the rubber-growing centers, several experiments were conducted at Institut des Recherches sur le Caoutchouc en Afrique to determine the properties of rubber plus vegetable and animal proteins (fish, whale, castor beans, soya, *Hevea* seeds, as well as casein and gelatine) and formaldehyde.[1]

On the whole, casein gave the most interesting results; tensile strength, modulus, and Shore hardness were nearly the same as for black-reinforced rubbers; tear strength was somewhat lower, but still high; heat build-up under dynamic stress was low. Abrasion resistance, however, appeared to be lower also. Mixes with ground-nut and soya protein, and gelatine, gave values close to those for casein; values for soluble fish and whale proteins were somewhat lower, but could be considerably improved by the inclusion of a small amount of casein. Promising experiments carried out with skim latex suggest possible outlets for this plentiful by-product of centrifuging latex; it slightly improved the mechanical properties of rubber, an effect enhanced by the addition of casein.

Further investigations are still in progress.

[1] Roland Chéritat, *Rev. gén. caoutchouc,* July-Aug., 1959, p. 1029.

Pelletized News

PHILLIPS PETROLEUM CO. and ANIC S.P.A. are forming an Italian company which will be known as Phillips Carbon Black Italiana S.p.A. to build and operate a plant in Italy to manufacture oil carbon black. The plant, which will have an initial design capacity of 25 million pounds per year of oil blacks, is scheduled to be in operation within two years. Engineering and design work is under way. The basic Phillips oil furnace black process will be used. ANIC is a company of the E.N.I. Group engaged in refining and petrochemical activities in Italy.

Legislation to control fragmentation of estates in Malaya may be urged by the National Union of Plantation Workers on the plea that it is causing widespread economic and social difficulties among estate workers.

THAILAND in July made a first direct shipment of 800 tons of rubber to Russia, and a further shipment of 1,000 tons was reportedly made in September.

The first steps have been taken to carry out the Selangor Government's land development scheme, for which it has set aside 22,000 acres. In the first phase of the plan, each of 1,000 families is to get six acres for planting rubber besides two acres of kampong land (for housing, raising foodstuffs, etc.). Only landless Federal citizens or State citizens come in for consideration. The government will provide building material and rubber seedlings as well as a small subsistence allowance in the first two years. The allowance will have to be repaid. The work of apportioning the first 8,000 acres is to start early in 1960.

INTERNATIONAL SYNTHETIC RUBBER CO. is building an extension at its Hythe, Southampton (England) plant, for the production of 2,500,000 gallons of general-purpose synthetic rubber latex annually, thereby increasing the existing overall capacity of 70,000 tons at the main plant by about 10%.

Japanese interests are shopping around for rubber plantations, preferably in Malaya because of existing stable political conditions. But though they are ready to buy up old Malayan estates for replanting (for which they apparently have the people with the required experience), the prices demanded have so far held them back. Better terms have been offered in Indo-China and Siam, it is claimed, but the unsettled conditions in those countries are not considered encouraging.

CZECHOSLOVAKIA continues to increase her exports of rubber footwear. In the prewar period typical shipments amounted to 9,142,000 pairs (1937). In the immediate postwar period, shipments ran about 9,741,000 pairs (1948). These figures have continued to climb, with 13,202,000 pairs being exported in 1957, and 13,750,000 pairs in 1958.

Ceylon's production of rubber fell sharply during the first half of 1959, amounting to only 35,832 tons, against 47,301 tons for the same months of '58.

N. V. CIAGO (N. V. Chemische Industrie AKU-Goodrich) Arnhem, Netherlands, formed jointly by AKU (Algemene Kunstzijde Unie) and the B. F. Goodrich Chemical Co. for the sale and manufacture of Hycar NBR rubbers in the Benelux Countries, has a plant on stream producing four of the Hycar rubbers and an SBR latex for making foam rubber.

East German foam rubber production is expected to rise from 585 tons in 1958 to 750 tons this year. With an increase to 3,000 tons anticipated for 1965, a new rubber combine is to be established in Leipzig. This combine will invest about 25,000,000 marks in facilities to be devoted chiefly to foam production.

THE RUBBER GROWERS' ASSOCIATION, London, England, in its list of current officers includes Thomas Henry Miller as chairman and William Anderson as vice chairman. Mr. Miller, former vice chairman, is widely known in the industry and is a director of a number of companies. Mr. Anderson spent 30 years in Malaya, was interned by the Japanese during World War II, is a director of Edward Bousted, Ltd., and is a director of several rubber plantations.

Tappers who take full advantage of the new wage agreement under which they receive allowances for scrap brought in and extra poundage of latex tapped, earn as much as $200 (Straits) a month, it is reported. With the 14 cents-a-day increase, recently added, this amount can be raised to $215 a month.

K. G. DEUTSCHE GASRUSSWERKE G.M.B.H. & CO., Dortmund, and DEGUSSA, Frankfurt/Main, plan to add to capacity to satisfy increased demand for furnace black in West Germany. The Dortmund plant capacity will be increased to 25,000 tons at the end of 1960, and Degussa will start producing furnace black at its Karlscheuern factory at an annual rate of 8,000 to 10,000 tons by the end of 1960.

News from Abroad

The rubber agreement between Indonesia and Russia, according to which Indonesia was to supply 14,000 tons of No. 1 and 2 RSS this year, has reportedly been extended by an additional 1,000-1,500 tons. A contract has also been signed with China for delivery of 1,000 tons of rubber a month, it is learned. Meanwhile, neither Russia nor China have recently bought from Malaya.

NUODEX PRODUCTS CO., a division of Heyden Newport Chemical Corp., New York, N. Y., has granted a license to Nuodex Argentina, S. A., to manufacture a complete line of paint driers and several specialty chemicals, near Buenos Aires. Nuodex Argentina was formed by Heyden Newport and a group of English and Argentine businessmen, headed by Cyril Taylor, president of Rodrap, S. A., of Buenos Aires.

Plans are under way for establishing a $30,000,000 synthetic rubber plant in India in collaboration with the Firestone company, it was revealed in Bombay recently. The proposed factory, to be built at Bareilly, Uttar Pradesh, will have a capacity of about 30,000 tons annually and will use alcohol from a large sugar refining enterprise as base material. Indian rubber consumption this year is put at 45,000 tons; the estimate for 1961 is 60,000 tons, and a further increase to 80,000 tons is expected by 1966.

THE FEDERATION GOVERNMENT OF MALAYA has realized substantially increased revenues from the rise in rubber prices. The 1959 budget was based on a price of 75 cents per pound, with anticipated revenue of $76,000,000 (Straits) for the year from rubber export duties. By the end of July, however, $89,978,965 had already been received, almost $14,000,000 more than the estimated revenue from this source for the entire year.

Production of styrene-butadiene synthetic rubber at the new Bunawerke Huls factory in West Germany got off to a good start, with very few mishaps, it is learned from a recent speech by Prof. P. Baumann, chairman of Chemische Werke Huls A.G., and chairman of the Supervisory Board of Bunawerke Huls G.m.b.H. A very uniform quality is being achieved, it was said. Before long, it is expected to put on the market a carbon black masterbatch consisting of 45 parts ISAF and 7.5 parts of an oil-plasticizer per 100 parts of Buna, later on to be followed by a masterbatch including 50 parts of HAF to 100 parts of Buna, but no oil plasticizer. Investigators at Huls are working on the development of a synthetic natural rubber as well as of other elastomers.

NEW EQUIPMENT

Golf ball mold gage

New Federal Mold Gage

A simple and precise gage for checking the accuracy of golf-ball and other similar-type molds has been developed by Federal Products Corp., Providence, R. I. The mold gage is designated Model 247 B-503.

The mold-half locates on a precision, 90-degree V-block and against a stop plate. It is rotated to check external diameter (using one dial indicator) and overall height (second dial indicator) which show variation from nominal to an accuracy of 0.0001-inch. Radius of the mold interior is checked to the same accuracy by a third dial indicator, mounted on a fixture which pivots accurately, permitting the indicator contact to sweep the interior between the rows of dimples (on the golf-ball mold). This fixture is also used to measure height of the dimple with reference to the area surrounding it.

Stay-up lifting levers for the first two indicators simplify loading. A T-bar retractor is provided for the third indicator. V-block position is adjustable so that the unit can be precisely located.

A simple and highly accurate master is furnished to permit rapid set-up and gage checking. All indicators have adjustable backs for coarse positioning, and adjustable dials for fine adjustment.

The ease with which this gage is set up and used makes it economical to discover any inaccuracy in new molds and to maintain closer control over the accuracy of molds in use.

New Daystom X-Ray Thickness Gage

New smaller models of a short-pulse X-ray thickness gage have been announced by the industrial gages department, Daystom, Inc., Newark, N. J. Designed for thickness measurements ranging from foil thicknesses of 0.00025-inch to plate thicknesses of 1.5 inches, the new short-pulse gage uses a sharply pulsed, pencil X-ray beam to measure end-to-end or side-to-side thicknesses of plastics, rubber, paper, fabrics, metals, and other

(*Continued on page 442*)

New Equipment

(*Continued from page 440*)

materials at speeds up to 6,000 feet per minute.

The pulsed X-ray energy source greatly reduces the low radiation level of the gage which requires only a minimum of shielding and makes possible a source unit only one-eighth the size of previous units, reports the company.

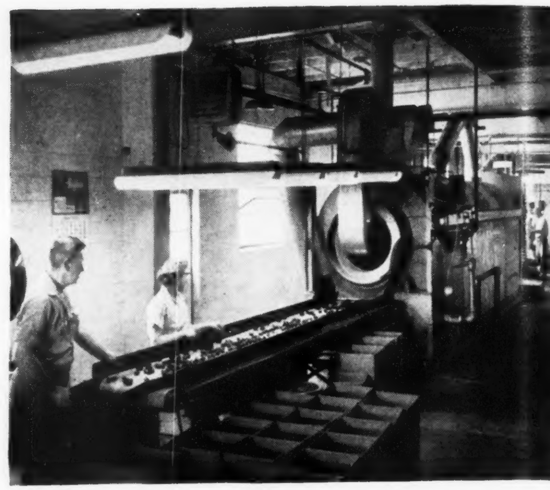
Capable of measuring thicknesses to tolerances of plus or minus 0.000010-inch, the new XactRay gage consists of an X-ray generator to supply a controlled pulsed beam, X-ray incident unit to detect the amount of transmitted energy, and indicator console containing electronic elements to convert and compute the variation of transmitted energy into terms of thickness variation and to initiate corrective action.

Design flexibility of the radiation source practically eliminates space limitations in locating the gage for minimum interference with process work. Various installation mountings are available, including synchronized travel of source and pick-up for between mill-frame installations, and on rigid, sliding, or rolling "C" yokes for manual or motorized positioning or withdrawal.

The new gage has a low noise level, compensating device for varying material densities, and absolute thickness calibration constant for the life of the gage since the unit always compares the material to fixed standards built into the gage for each thickness setting.

Additional information is available from the manufacturer.

New Machine Cleans Parts



Washing machine for molded parts

A new drum-type washing machine for rubber parts has been developed by Ransohoff Co., Hamilton, O. Designed to clean completely the parts, the machine is unique in that it requires no pumps to handle the liquids involved. This situation is met by dip cups on the drums which pick up the liquid and pass it into the drum in the up stroke and then let it back out on the down stroke. This operation insures a continual recirculation of the liquids. The machine is divided into four parts, allowing the parts to be subjected to a hot dip rinse, a hot wash, a hot rinse, and finally a drying cycle.

The machine requires only 125 square feet of area, is approximately 25 feet long by five feet wide and nine feet high. The stainless-steel drum is 36 inches in diameter and 25 feet long and will handle 10,000 to 12,000 pounds of molded parts in an eight-hour period. Heated by gas, the machine provides

(*Continued on page 444*)

Reprints for Sale

The following reprints of the very informative articles which have appeared in RUBBER WORLD may be had at the prices indicated:

Fundamental Control Concepts. 8 pages. **35¢** each. **Fundamental Control Techniques — Frequency Distributions.** 8 pages. **35¢** each. **Fundamental Control Techniques — Control Charts—I.** 12 pages. **50¢** each. — **Control Charts —II.** 12 pages. **50¢** each. All by Mason E. Wescott.

Influence of Accelerator Residues on Age Resistance of Elastomeric Vulcanizates. By Z. T. Ossefort. **50¢** each.

Light-Colored, Non-Blooming Butyl Rubber Compounds. By R. O. Treat and J. E. Allen. **25¢** each.

The ASTM Crude Natural Rubber Subcommittee—Organization, History, and Accomplishments. By Norman Bekkedahl and R. G. Seaman. **10¢** each.

RUBBER WORLD

630 Third Avenue • New York 17, N. Y.

New Equipment

(Continued from page 442)

the washing action by the liquids and by the cascading action of the rotating drum. Operation is completely automatic, with a bucket conveyor feed into the machine and discharge out of the machine and with a helix providing continuous flow through the drum.

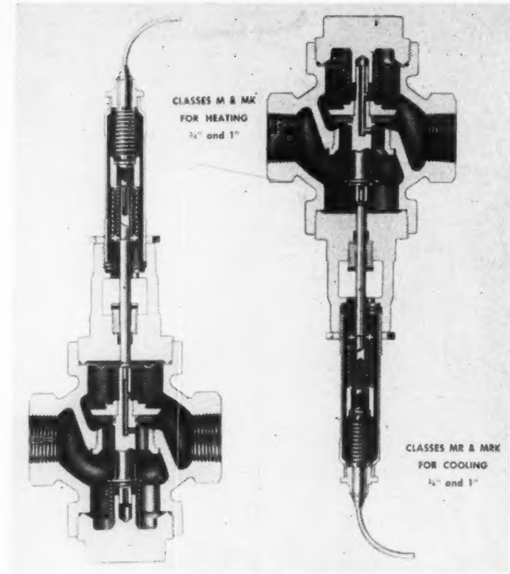
New Leslie Temperature Regulator

Leslie Co., Lyndhurst, N. J., regulator and controller manufacturer, has added to its line of temperature regulators a new design for steam and water service.

Designated as Class M (direct acting) for heating service, and Class MR (reverse acting) for cooling service, these regulators are manufactured in ¾-inch and one-inch body sizes in both cast-iron and bronze with screwed ends. They are self-contained, self-operated. The new design includes a unique balancing bellows which permits smooth functioning at inlet pressures and pressure drops up to 100 psi. Other features include a self-alining, single-seated, tight-closing main valve guided throughout its entire stroke.

Variations in temperature are sensed by a liquid filled thermo-element which is fully interchangeable to eliminate any messy vapor filling maintenance requirements. Volumetric expansion or contraction of the thermo-element fluid is translated into uniform motion of the valve stem with a precise degree of accuracy and sensitivity. Adjustment for any set temperature is accomplished by hand, by turning of a knurled adjusting sleeve which may be equipped with a calibrated dial.

A variety of thermo-elements with various ranges, spans, and bulb materials are available. Elements can all be interchanged in the field quickly without the need of special tools or training.



Temperature Regulators M & MK, MR & MRK

One can, moreover, reverse the valve action from heating to cooling (or cooling to heating) by interchanging the bottom cap and bonnet assembly.

Applications include instantaneous heaters and coolers, shell and tube or shell and coil heat exchangers, process heating and cooling, as well as space heaters and systems for air conditioning.

Bulletin 591 containing complete sizing and capacity data is available from the company.

MARKET REVIEWS

Natural Rubber

During the period under review (October 16-November 15) the Singapore market had been leading the world's rubber trade. Under the pressure of continued shortcomings of RSS #1 for October and November shipment a violent upswing in values occurred. Toward the close of the period, however, there seems to have been a little wavering as short accounts were closed.

Although New York and London have been influenced by these gyrations, they have exhibited a degree of reluctance with the result that RSS #1 values have been quite out of line. Offgrades have been somewhat neglected, and values of these have, on the whole, been running fairly level in all markets, it was reported.

During this period the British Government started to sell its stockpiled rubber. Its stockpile currently amounts to about 100,000 tons, and disposal is expected to be spread over a number of years. The release plan provides that maximum tonnages to be sold in any calendar month will follow a graduated scale according to prices. The sliding scale for disposals was suggested by producing-country governments.

The United States Government announced that it had sold 5,796 long tons of crude natural rubber from its stockpile between October 16 and October 30. The General Services Administration expects to sell about 50,000 tons without replacement by June 30, 1960.

October sales, on the New York Commodity Exchange, amounted to 13,780 tons, compared with 15,490 tons for September contract. There were 21 trading days in October, and 20 during the October 16-November 15 period.

REX CONTRACT

	Oct. 23	Oct. 30	Nov. 6	Nov. 13
Nov.	40.74	43.50	44.00	47.25
1960				
Jan.	36.90	38.65	38.45	42.95
Mar.	35.57	36.55	36.75	40.00
May	35.00	35.60	35.80	38.95
July	34.50	35.15	35.20	38.00
Sept.	34.25	34.90	34.90	37.60
Nov.	34.00	34.60	34.60	37.20

On the physical market, RSS #1, according to the Rubber Trade Association of New York, averaged 43.83¢ per pound for the October 16-November 15 period. Average October sellers' prices for representative grades were: RSS #3, 40.26¢; #3 Amber Blankets, 38.12¢; and Flat Bark, 35.30¢.

NEW YORK OUTSIDE MARKET

	Oct. 23	Oct. 30	Nov. 6	Nov. 13
RSS #1	42.75	45.00	43.50	47.00
#2	41.50	44.50	43.00	46.50
#3	40.25	43.00	42.50	46.00
Pale Crepe				
#1 Thick	47.00	48.00	47.00	51.00
Thin	47.00	48.00	46.50	50.00
#3 Amber Blankets	38.00	39.75	39.25	41.75
Thin Brown Crepe	37.75	39.50	38.75	41.50
Standard Flat Bark	35.50	37.25	36.50	39.00

Synthetic Rubber

A new monthly high for production of synthetic rubber was established with 128,617 long tons for October, contrasted with the previous peak of 119,847 long tons for September, 1959, according to the monthly report of The Rubber Manufacturers Association, Inc.

Consumption of new rubber in the United States for October totaled 146,250 long tons, against 146,111 long tons for September. Consumption of all types of synthetic rubber in October was 97,480 long tons, contrasted with September's consumption of 96,859 long tons.

Consumption by type in October, compared with September usage, in long tons, rose for SBR and neoprene, but dropped for butyl and nitrile, as follows: SBR, 80,840, against 79,835; neoprene, 7,620, against 7,326; butyl, 5,950, against 6,579; and nitrile, 3,070, against 3,119.

Exports for all types fell to 16,690 tons in October from 30,302 tons in September.

Trends in SBR masterbatches showed the oil-black masterbatch production up to 22,885 from 19,425 tons in September. Carbon black masterbatches in contrast declined to 3,512 tons in October from 5,034 tons in September. The oil-extended rubber production showed a slight decrease to 27,217 tons in October from 28,217 tons in September.

Total new rubber consumption for the 10-month period reached 1,367,053 long tons, of which 897,277 long tons were synthetic.

Latex

During the October 16-November 15 period little change occurred in the general supply position of latex. The day-to-day price quotations for drum latex have shown a regular upward trend in harmony with the persistent advance in the price of dry rubber.

A certain amount of buying for nearby and slightly more forward shipment has been reported, but at the present high price level buyers appear more reluctant.

With these signs of buying resistance comes the announcement by a synthetic producer in the United States of the development and volume production of a new synthetic latex which is said to have excellent properties for the production of foam. This development might lead to a decline in the present very high premium for natural latex although, at the time of writing, there has been no evidence of such.

Consumption in the United States during September amounted to 6,342 tons of natural and 9,007 tons of synthetic, compared with 6,613 and 9,425 tons, respectively, during August.

Malayan production in September totaled 11,111 tons, compared with 11,071 tons in August.

Prices for ASTM centrifuged concentrated natural latex, in tank-car quantities, f.o.b., rail tank car, ran about 49.00¢ per pound solids. Synthetic latices prices were 26.0 to 40.25¢ for SBR; 37 to 57¢ for neoprene; and 45 to 60¢ per pound for the nitrile types.

(All Figures in Long Tons, Dry Weight)

Type of Latex	Production	Imports	Consumption	Month-End Stocks
Natural				
Aug.	0	7,131	6,613	11,472
Sept.	0	*	6,342	11,742
SBR				
Aug.	8,225	....	7,348	6,775
Sept.	8,201	....	6,919	7,196
Neoprene				
Aug.	1,242	0	961	1,576
Sept.	956	0	910	1,498
Nitrile				
Aug.	1,258	0	1,116	2,779
Sept.	1,364	0	1,178	2,810

* Not available yet for period covered.

Scrap Rubber

Foreign trade scrap rubber slackened during August, with both exports and imports declining from the July figures, according to the Bureau of the Census, United States Department of Commerce.

August scrap rubber exports totaled 3,560,318 pounds, worth $103,886, compared with 5,512,452 pounds, valued at

$167,166, in July. Scrap rubber imports in August dipped to 2,356,998 pounds, valued at $89,338, from July's 2,581,870 pounds, worth $67,866.

Marketwise, there was little change this period (October 16-November 15) with material moving along at a fairly even, but unexciting pace to consumers. Prices were reported steady.

	Eastern Points	Akron, O.
	Per Net Ton	
Mixed auto tires	$7.00	$12.50
S.A.G. truck tires	nom.	17.00
Peeling, No. 1	nom.	26.00
2	nom.	22.00
3	nom.	19.00
Tire buffings	nom.	nom.
	(¢ per Lb.)	
Auto tubes, mixed	4.00	4.00
Black	5.75	5.75
Red	6.25	6.25
Butyl	5.50	5.50

Reclaimed Rubber

One reclaimer in the East reported that the reclaimed rubber market was just beginning to feel the impact of the steel strike on the automobile industry during the October 16-November 15 period. In this period, this reclaimer reported, shipments were 10 to 12% lower than in the previous period.

It also appears at this writing that shipments will remain at about the present level until the end of the year.

In spite of the fact that shipments for the period under review were lower than for some of the previous periods which this reclaimer has experienced this year, it should be pointed out that the reclaimed rubber market is continuing at a moderately high rate and will result in one of its best years.

Another reclaimer in the Midwest reported that its business has held up very well despite the steel strike, and October was one of the best months this company has had for a long time. The company expected things to slow up some during November, but until then business remained good.

Reclaimed rubber exports dropped to 1,982,266 pounds, worth $213,611, in August from 2,780,480 pounds, value $306,449, in July. Reclaimed rubber imports in July amounted to 47,928 pounds, worth $6,470. No figures are available for August imports of reclaimed rubber.

According to The Rubber Manufacturers Association, Inc., report, October production of reclaimed rubber was 28,400 long tons; while consumption was 26,200 long tons.

Naugatuck Chemical Division, United States Rubber Co., Naugatuck, Conn., reported that it had found it necessary to increase prices on some of its reclaimed rubbers because of higher material and labor costs. The boost became effective December 1. The groups currently affected involved reclaimed rubbers dependent upon butyl inner tube and natural rubber inner tube scrap sources. A new price list is available from the company.

Reclaimed Rubber Prices

Whole tire, first line	$0.11
Third line	.1025
Inner tube, black	.16
Red	.21
Butyl	.14
Light carcass	.22
Mechanical, light-colored, medium gravity	.155
Black, medium gravity	.085

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and specific gravity, at special prices.

Rayon and Nylon

The battle between the rayon and nylon tire cord producers continues. Nylon tire yarn price reductions (in August) were quickly recognized as a new threat to rayon's position in the field since it brought the prices of the two products much closer even though rayon remained slightly lower. Rayon producers consequently felt compelled to reduce their own prices 4-5¢ a pound.

Nylon has made considerable gains in the last several years in the tire cord field, but it has been mainly in the replacement-tire market. In this area, nylon now accounts for more than 50% of the tire market, but in the original-equipment field viscose-type yarns still reign supreme, giving the overall dominance in the field to viscose.

Nylon cord tires were seriously considered a couple of years ago for original equipment by the auto industry, but price helped to rule it out.

What will happen in the future is not clear at the present. Nylon yarn producers still are aiming at the original-equipment market for subsequent years like 1961 or even later. The recent reduction in nylon yarn prices is believed to have been aimed primarily as an inducement to make Detroit take another look.

But, meanwhile, leading rayon producers recently announced even further improvements in the quality of their Tyrex viscose yarn which will be available in 1960, and such improvements are bringing it closer to nylon in certain vital respects, some tire industry spokesmen admit.

One source, apparently having little information for the period under review, gave the following report: "I've racked my brain and searched my file, but can't find a thing that's really worthwhile. Prices are stable, the status is quo; that's all there is, there ain't no mo'."

Total packaged production of rayon and acetate filament yarn during October was 59,800,000 pounds, consisting of 26,500,000 pounds of high-tenacity rayon yarn and 33,300,000 pounds of regular-tenacity filament yarn. Production for September had been: total, 63,000,000 pounds; high-tenacity, 29,200,000 pounds, and regular-tenacity, 33,800,000 pounds.

Filament yarn shipments for October to domestic consumers totaled 57,700,000 pounds, of which 25,300,000 pounds were high-tenacity rayon yarn, and 32,400,000 pounds were regular-tenacity rayon yarn. Shipments for September were: total, 58,700,000 pounds; high-tenacity, 32,100,000 pounds; regular-tenacity, 26,600,000 pounds.

Rayon Prices

Tire Fabrics

1100/490/2	$0.625/$0.78
1650/908/2	.685
2200/980/2	.655

Tire Yarns

High-Tenacity	
1100/ 490, 980	.62/ .66
1100/ 490	.62/ .66
1150/ 490, 980	.59/ .63
1165/ 480	.59/ .66
1230/ 490	.59/ .63
1650/ 720	.55/ .60
1650/ 980	.55/ .58
1875/ 980	.55/ .58
2200/ 960	.54/ .57
2200/ 980	.54/ .57
2200/1466	.64
4400/2934	.60
Super-High Tenacity	
1650/ 720	.55/ .60
1900/ 720	.58

Nylon Prices

Tire Yarns

840/140	1.06
1680/280	1.03

Industrial Fabrics

Contract backlogs of industrial grey cotton goods mills were approaching final production and delivery scheduled dates during the October 16-November 15 period. So far, they are being sparsely followed by new or renewed commitments, it was reported. Most of the current calls on mills concern fill-in yardages for spot or early shipments. Almost invariably prices quoted or paid reflected a firmer market. Exceptions involved isolated constructions and widths, fabrics identified as basic with coaters serving the auto industry.

In connection with coaters' industrial cloths, almost every weaving mill has had delivery deferment requests. These involve yardages that ordinarily would have left the mills a month or more ago. The lack of enough steel accounts for the held-up shipments. Broken twills and drills are mostly involved in this situation. Mention was made of considerable 54-inch 1.14-yard broken twills being on hand and awaiting a market. It is regarded as natural to expect that once enough steel is pro-

CYANAMID RUBBER Chem Lines

NO. 25 OF A SERIES Published by AMERICAN CYANAMID COMPANY, Rubber Chemicals Department, Bound Brook, New Jersey

Accelerator Combinations Match Processing Conditions

Previous articles in this series have pointed out the varying degrees of processing safety available with Cyanamid's broad line of accelerators. For example, the following values for Mooney scorch were observed in a recent study of an SBR tread stock:

Mooney Scorch* (MS) at 280°F.

CYDAC®	25
NOBS Special	34
DIBS®	43

*10-point rise above minimum

It was pointed out in the earlier articles that the variation in these accelerators is only in *processing safety;* they all cure at the same rate once the cure starts. The compounder is enabled to match the conditions of his plant closely by selecting the accelerator to give the desired safety for processing and mold flow, and then to provide rapid cure.

Even closer control of total processing-curing time is possible by the use of a mixed accelerator system. To illustrate this, five stocks were mixed according to the recipe given, using 1.0 part of total accelerator in the following combinations of CYDAC and DIBS:

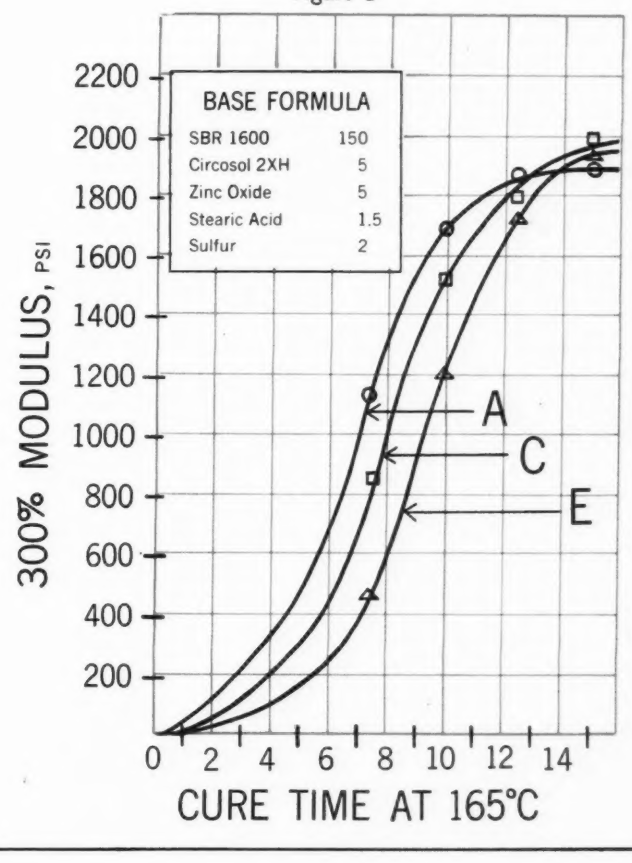
Compound	*CYDAC*	*DIBS*	*Scorch at 280°F.*
A	1.0	—	25
B	0.75	0.25	26
C	0.50	0.50	31
D	0.25	0.75	36
E	—	1.0	43

The Mooney scorch (MS) at 280°F. was as indicated. The graph in Figure 1 portrays the modulus observed at the designated curing times at 165°C. (328°F.). Since the consecutive curves lie fairly close to each other, only Compounds A, C and E are plotted, but to illustrate the differences at the early stages of cure, the modulus of the 7½-minute cure was as follows:

Compound	*300% Modulus, psi*
A	1150
B	1100
C	850
D	725
E	475

All the stocks cured to approximately the same state, and at very similar rates. The same type of variation can be achieved with mixtures of NOBS® Special and DIBS. Thus, the modern plant is enabled to match acceleration very closely to processing and curing conditions for maximum efficiency and uniformity of product. Cyanamid's quality rubber chemicals produce quality rubber products.

Figure 1



curable, this inventory will tend to melt away.

Some time ago the interest in first-quarter production began to take form between weavers and customers. Now negotiations have diminished to where this formative business is staging a waiting process. When it finally revives to the point of order-placing, mills are due to receive a very considerable aggregate contract yardage. Higher prices are envisaged as a result.

Industrial Fabrics

Drills*		
59-inch, 1.85, 68x40 ....*yd.*	$0.385	
2.25, 68x40	.325	
Broken Twills*		
54-inch, 1.14, 76x52 ....*yd.*	.52	
58-inch, 1.06, 76x52	.585	
60-inch, 1.02, 76x52	.5825	
Osnaburgs*		
40-inch, 2.11, 35x25 ....*yd.*	.2275	
3.65, 35x25	.1525	
59-inch, 2.35, 32x26	.295	
62-inch, 2.23, 32x26	.305	
Ducks		
Numbered Duck†		
List less 45%		
Enameling Ducks*	S. F.	D. F.
38-inch, 1.78 yd.	$0.3263	.3313
2.00 yd.	.275	.28
51.5-inch, 1.35 yd.	.45	.47
57-inch, 1.22 yd.	.4838	.50
61.5-inch, 1.09 yd.	.5413	.5538
Hose and Belting Duck*		
Basis ....*lb.*	.60	
Army Duck†		
52-inch, 11.70 oz., 54x40 (8.10 oz./sq.yd.) ....*yd.*	.5925	
Sheeting*		
40-inch, 3.15, 64x64 ....*yd.*	.2175	
3.60, 56x56	.185	
52-inch, 3.85, 48x48	.235	
57-inch, 3.47, 48x48	.245	
60-inch, 2.10, 64x64	.365	
2.40, 56x56	.3275	
Sateens*		
53-inch, 1.12, 96x60 ....*yd.*	.6275	
1.32, 96x64	.56	
57-inch, 1.04, 96x60	.615	
58-inch, 1.02, 96x60	.68	
1.21, 96x64	.61	
Chafer Fabrics*		
14.40-oz./sq.yd. P.Y. ....*lb.*	.71	
11.65-oz./sq.yd. S.Y.	.61	
10.80-oz./sq.yd. S.Y.	.65	
8.9-oz./sq.yd. S.Y.	.67	
40-inch, 2.56, 35x25	.25	
60-inch, 1.71, 35x25	.435	

* Net 10 days.
† 2% 10 days.

STATISTICS

of the RUBBER INDUSTRY

U.S.A. Imports and Production of Natural and Synthetic Latices

(Long Tons, Dry Weight)

Year	Natural	SBR	Neoprene	N-Type	Total Synthetic	Total Natural & Synthetic
1958						
Nov.	4,074	7,307	1,156	1,205	9,668	13,744
Dec.	7,950	6,891	986	1,033	8,910	16,860
1959						
Jan.	8,574	7,801	1,049	1,104	9,954	18,528
Feb.	5,746	7,578	998	1,161	9,737	15,483
Mar.	7,039	8,587	1,013	1,269	10,869	17,908
Apr.	6,342	6,730	1,301	911	8,942	15,284
May	6,007	6,583	1,146	1,156	8,885	14,892
June	7,445	6,730	1,223	1,196	9,149	16,594
July	5,469	6,871	956	1,279	9,106	14,575
Aug.	7,131	8,225	1,242	1,258	10,725	17,856
Sept.*	....	8,201	956	1,364	10,521	....

* Preliminary.
Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

U.S.A. Consumption of Natural (Including Latex) and Synthetic Rubber (Long Tons)

Year	Natural	SBR Types	Butyl	Neoprene	N-Type	Total Natural and Synthetic
1958						
Nov.	43,031	66,294	4,419	6,448	2,562	122,754
Dec.	46,891	71,731	4,897	6,955	2,606	133,080
1959						
Jan.	49,913	74,222	5,359	7,198	2,857	139,549
Feb.	47,345	72,558	5,256	6,885	2,694	134,738
Mar.	51,991	78,792	5,687	7,444	3,166	147,080
Apr.	41,483	64,547	4,758	7,493	2,941	121,222
May	38,777	60,870	3,978	6,914	2,853	113,392
June	47,786	76,065	5,484	7,083	3,063	139,481
July	47,545	78,995	6,043	6,277	2,419	141,279
Aug.	46,914	75,340	5,533	7,117	3,047	137,951
Sept.*	49,252	79,835	6,579	7,326	3,119	146,111

* Preliminary.
Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

U.S.A. Stocks of Latex

(Long Tons, Dry Weight)

Year	Natural	SBR	Neoprene	N-Type	Total Synthetic	Total Natural & Synthetic
1958						
Nov.	8,795	7,810	1,498	2,530	11,838	20,633
Dec.	8,900	7,672	1,563	2,519	11,754	20,654
1959						
Jan.	10,025	7,822	1,551	2,418	11,791	21,816
Feb.	10,482	7,753	1,488	2,535	11,776	22,258
Mar.	9,375	8,209	1,441	2,670	12,320	21,695
Apr.	8,599	7,859	1,458	2,379	11,696	20,295
May	9,718	7,917	1,417	2,398	11,732	21,450
June	11,063	7,314	1,601	2,432	11,347	22,410
July	10,752	6,983	1,528	2,761	11,272	22,024
Aug.	11,472	6,775	1,576	2,779	11,130	22,602
Sept.*	11,742	7,196	1,498	2,810	11,504	23,246

* Preliminary.
Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

U.S.A. New Supply, Consumption, Exports, and Stock of Reclaimed Rubber

(Long Tons)

Year	New Supply	Consumption	Exports	Stocks
1958				
Nov.	22,450	21,271	1,051	27,680
Dec.	24,800	23,285	841	29,063
1959				
Jan.	25,790	25,002	1,157	27,157
Feb.	25,290	24,471	1,041	27,504
Mar.	29,310	27,869	1,375	27,582
Apr.	21,671	22,380	1,225	25,131
May	19,401	20,496	980	23,554
June	26,119	24,998	1,054	23,448
July	27,863	23,942	1,236	25,949
Aug.	25,276	22,914	879	26,165
Sept.*	28,123	25,137	....	27,384

* Preliminary.
Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

U.S.A. Exports of Synthetic Rubber

(Long Tons)

Year	SBR Types	Butyl	Neoprene	N-Type	Total
1958					
Nov.	11,872	1,306	3,010	639	16,827
Dec.	12,634	1,258	2,484	520	16,896
1959					
Jan.	11,962	1,579	3,430	520	17,491
Feb.	11,615	1,169	2,404	648	15,836
Mar.	16,295	2,238	2,712	467	21,712
Apr.	19,154	2,135	2,741	527	25,557
May	12,281	2,587	2,942	642	18,452
June	21,871	2,386	2,522	937	27,716
Aug.	19,814	1,580	4,105	440	25,939
Sept.	18,054	1,896	2,557	1,025	23,532

Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

U.S.A. Stocks of Synthetic Rubber

(Long Tons)

Year	SBR Types	Butyl	Neoprene	N-Type	Total
1958					
Nov.	140,673	20,192	15,373	7,273	183,511
Dec.	143,533	18,770	15,488	7,292	185,083
1959					
Jan.	147,243	16,827	15,638	7,335	187,043
Feb.	148,606	16,339	15,990	7,468	188,403
Mar.	146,971	14,441	14,701	7,753	183,866
Apr.	147,867	12,496	14,848	7,728	182,939
May	156,209	12,710	15,024	7,820	191,763
June	145,486	11,128	14,986	7,969	179,569
July	142,606	9,899	15,187	8,912	176,604
Aug.	148,795	10,558	15,745	8,418	183,516
Sept.*	147,400	9,535	12,845	8,526	178,306

* Preliminary.
Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

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World Consumption of Natural Rubber

(1,000 Long Tons)

Year	United States	Eastern Europe and China	United Kingdom	Other Foreign	Total Foreign	Grand* Total
1958						
July	34.2	27.9	12.7	74.0	115.8	152.5
Aug.	39.4	33.4	8.7	60.6	102.7	145.0
Sept.	44.8	49.3	16.8	78.7	145.2	187.5
Oct.	48.9	40.5	14.2	82.1	136.8	185.0
Nov.	43.1	32.7	14.2	78.4	125.3	167.5
Dec.	47.0	46.5	17.0	76.8	140.5	187.5
1958 Total	485.2	427.0	175.5	895.8	1,497.3	1,982.5
1959						
Jan.	50.0	49.6	15.3	77.2	127.2	192.5
Feb.	47.3	29.8	13.8	77.7	117.5	167.5
Mar.	52.0	19.0	15.3	78.8	117.7	165.0
Apr.	41.5	37.8	13.9	80.2	131.0	172.5
May	38.8	41.2	13.8	76.2	131.2	170.0
June	47.8	42.1	18.3	82.4	134.7	182.5
July	47.5	32.7	13.0	79.8	127.5	175.0
Aug.	46.9	...	11.0	...	98.1	145.0

*Estimated.
Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce; and Secretariat of the International Rubber Study Group.

World Production of Natural Rubber

(1,000 Long Tons)

Year	Malaya Estate	Malaya Native	Indonesia Estate	Indonesia Native	All Other	Total
1958						
July	36.5	23.8	20.8	45.3	175.0	48.6
Aug.	34.0	24.8	19.5	42.9	172.5	51.3
Sept.	33.8	23.6	19.0	38.6	167.5	52.5
Oct.	35.1	23.7	20.1	43.4	175.0	52.7
Nov.	31.9	19.8	20.1	43.3	170.0	54.9
Dec.	41.5	30.1	21.5	45.8	195.0	56.1
1958 Total	390.9	272.7	237.4	377.1	1,955.0	676.9
1959						
Jan.	37.6	27.2	20.3	22.4	82.5	190.0
Feb.	27.9	21.2	18.0	29.5	58.4	145.0
Mar.	28.5	21.1	17.4	40.3	45.2	155.0
Apr.	28.9	19.4	15.5	45.2	46.0	155.0
May	33.5	22.4	16.1	51.2	49.3	172.5
June	33.9	24.3	18.3	50.1	38.4	165.0
July	35.7	26.9	18.7	36.0	60.2	177.5
Aug.	36.5	24.9	18.3	43.6	51.7	175.0

Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce; Secretariat of the International Rubber Study Group.

World Consumption of Synthetic Rubber*

(1,000 Long Tons)

Year	U.S.A.	Canada	United Kingdom	Total† Continent of Europe	World† Grand Total
1958					
July	63.9	3.9	4.7	13.5	92.5
Aug.	71.8	3.0	3.1	10.3	95.0
Sept.	78.5	4.2	5.8	14.0	110.0
Oct.	88.0	4.1	4.8	14.8	120.0
Nov.	79.0	4.3	5.2	13.8	110.0
Dec.	85.4	4.3	6.2	13.8	115.0
1958 Total	872.2	46.7	63.0	173.0	1,225.0
1959					
Jan.	89.6	4.4	5.8	15.5	122.5
Feb.	87.4	5.2	5.7	15.5	122.5
Mar.	95.1	5.0	7.0	15.8	130.0
Apr.	79.7	5.1	6.2	17.0	117.5
May	74.6	4.8	6.0	15.5	110.0
June	91.7	5.5	8.1	18.0	130.5
July	93.7	4.5	5.4	...	127.5
Aug.	91.0	...	4.3	...	122.5

*Includes latices.
† Figures estimated or partly estimated.
Source: Secretariat of the International Rubber Study Group; and Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

World Production of Synthetic Rubber

(1,000 Long Tons)

Year	U.S.A.	Canada	Germany	Total
1958				
June	74.1	10.2	1.1	85.4
July	77.1	11.2	2.6	91.0
Aug.	87.3	10.9	2.3	100.5
Sept.	90.9	11.5	2.2	104.7
Oct.	100.9	12.5	2.4	115.9
Nov.	102.5	12.1	3.1	117.7
Dec.	101.6	12.9	2.7	117.3
1958 Total	1,052.8	135.0	22.7	1,210.5
1959				
Jan.	108.5	13.0	2.0	123.5
Feb.	102.3	11.7	2.3	116.3
Mar.	111.4	7.5	3.7	122.6
Apr.	108.5	0.0	3.5	111.9
May	110.0	0.3	3.0	113.3
June	106.7	0.4	4.7	111.5
July	114.3	9.2	3.2	126.7
Aug.	119.0	...	...	....

Source: Secretariat of the International Rubber Study Group; and Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

U.S.A. Imports and Production of Natural (Including Latex and Guayule) and Synthetic Rubber (in Long Tons)

Year	Natural	SBR Types	Butyl	Neoprene	N-Type	Total Natural and Synthetic
1958						
July	25,823	64,944	3,698	6,248	2,193	102,906
Aug.	39,057	73,338	4,455	6,745	2,783	126,378
Sept.	41,343	75,111	4,117	8,586	3,165	132,322
Oct.	45,136	82,741	5,338	9,283	3,619	136,022
Nov.	41,819	84,382	4,145	10,394	3,575	134,647
Dec.	54,491	85,270	3,933	9,201	3,217	156,112
1959						
Jan.	54,950	90,261	4,992	9,991	3,260	163,454
Feb.	48,917	83,067	5,650	10,256	3,324	151,214
Mar.	48,584	91,847	6,056	9,690	3,784	159,961
Apr.	44,347	88,444	6,279	10,455	3,299	152,824
May	45,451	89,625	6,467	10,249	3,610	155,402
June	46,048	87,221	5,583	10,216	3,696	153,124
July	47,527	94,749	6,391	9,365	3,811	161,843
Aug.	45,359	97,113	8,050	10,471	3,397	164,930
Sept.*	....	97,677	7,399	10,888	3,883	......

*Preliminary.
Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

U.S.A. Consumption of Natural and Synthetic Latices

(Long Tons, Dry Weight)

Year	Natural	SBR	Neoprene	N-Type	Total Synthetic	Total Natural & Synthetic
1958						
May	5,004	4,102	785	795	5,682	10,686
June	5,304	4,165	639	919	5,723	11,027
July	4,531	3,433	629	703	4,765	9,296
Aug.	6,094	4,654	764	1,025	6,443	12,537
Sept.	6,748	5,779	820	1,017	7,616	14,364
Oct.	7,725	6,534	979	1,120	8,633	16,358
Nov.	6,540	6,009	798	1,108	7,915	14,455
Dec.	6,820	6,893	805	1,106	8,804	15,624
1959						
Jan.	7,184	6,886	925	1,244	9,055	16,239
Feb.	6,489	7,083	859	1,009	8,951	15,440
Mar.	7,052	7,275	1,054	1,208	9,537	16,589
Apr.	5,793	5,629	1,104	1,169	7,902	13,695
May	5,429	5,962	995	1,112	8,069	14,966
June	5,622	6,497	910	1,150	8,557	14,179
July	5,004	5,804	919	940	7,663	12,667
Aug.	6,613	7,348	961	1,116	9,425	16,038
Sept.*	6,342	6,919	910	1,178	9,007	15,349

* Preliminary.
Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

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1000-Ton Elmes Multi-Opening Hydraulic Press; 30" diameter ram. Eleven 37" x 37" steam platens. A real buy!
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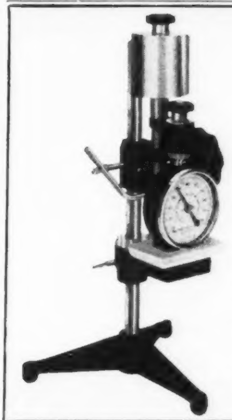

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Carbon Black Statistics—January-September, 1959

Furnace blacks are classified as follows: SRF, semi-reinforcing furnace black; HMF, high modulus furnace black; GPF, general-purpose furnace black; FEF, fast-extruding furnace black; HAF, high abrasion furnace black; SAF, super abrasion furnace black; ISAF, intermediate super abrasion furnace black.

(Thousands of Pounds)

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.
Production									
Furnace types									
Thermal	12,187	11,675	12,469	14,293	14,443	13,375	13,490	14,364	12,912
SRF	23,004	21,767	23,108	22,957	23,728	22,925	25,606	23,046	28,146
HMF	6,487	5,169	5,694	6,810	5,412	6,043	7,321	7,160	6,768
GPF	5,000	5,545	6,942	7,937	8,723	7,849	7,263	9,382	7,457
FEF	21,579	19,286	23,372	21,683	20,925	20,955	21,284	21,541	20,896
HAF	39,114	37,892	46,534	43,315	45,057	38,694	44,418	45,784	45,359
SAF	293	—	—	—	1,656	3,303	618	4	650
ISAF	16,605	14,490	19,262	19,770	18,365	16,366	21,133	21,571	20,494
Total furnace	124,269	118,824	137,381	136,265	138,309	130,010	141,493	142,852	142,682
Contact types	26,890	24,695	28,029	27,624	27,752	26,346	27,076	27,495	26,286
Totals	151,159	143,519	165,410	164,389	166,061	156,356	168,569	170,347	168,968
Shipments									
Furnace types									
Thermal	12,283	12,658	14,904	13,223	12,313	14,105	12,299	14,242	15,640
SRF	26,251	26,009	29,465	24,244	21,012	23,650	25,805	26,811	31,050
HMF	6,420	5,122	6,299	5,895	5,748	6,061	7,454	6,579	7,949
GPF	6,977	7,245	7,397	8,336	8,375	8,091	8,898	6,781	7,148
FEF	24,511	20,924	25,949	19,575	17,558	20,991	22,865	22,163	24,077
HAF	45,800	42,890	47,161	40,675	32,238	43,360	49,883	47,625	52,007
SAF	615	583	897	553	946	1,543	950	1,147	1,053
ISAF	17,391	16,739	19,859	18,934	19,133	19,956	23,399	21,051	23,470
Total furnace	141,248	132,170	151,931	131,435	117,323	137,757	151,553	146,426	162,394
Contact types	31,852	28,221	29,214	24,453	26,386	25,574	29,207	26,198	35,488
Totals	172,100	160,391	181,145	155,888	143,709	163,331	180,760	172,624	197,882
Producers' Stocks, End of Period									
Furnace types									
Thermal	23,181	22,198	19,759	20,829	22,959	22,729	23,920	24,042	21,314
SRF	35,764	31,522	25,165	23,979	26,842	26,254	26,192	22,585	19,681
HMF	6,856	6,903	6,298	7,169	6,686	6,668	6,535	7,162	5,981
GPF	7,658	5,958	5,503	5,104	5,452	5,073	3,661	6,085	6,394
FEF	17,213	15,575	12,998	15,106	18,473	18,437	16,856	16,234	13,053
HAF	38,010	33,012	32,382	35,018	47,837	43,171	37,706	35,838	29,190
SAF	5,071	4,487	3,586	3,028	3,738	5,498	5,166	4,023	3,576
ISAF	38,708	39,459	38,862	39,698	38,930	35,340	33,074	33,594	30,618
Total furnace	172,461	159,114	144,553	149,931	170,917	163,170	153,110	149,563	129,807
Contact types	88,646	85,120	83,935	87,098	88,368	89,140	87,009	88,306	78,882
Totals	261,107	244,234	228,488	237,029	259,285	252,310	240,119	237,869	208,689
Exports									
Furnace types									
Total furnace	29,543	19,442	30,154	29,600	27,123	163,170	30,453	28,201	—
Contact types	15,604	12,930	13,037	11,702	14,079	89,140	12,157	12,713	—
Totals	45,147	32,372	43,191	41,302	41,202	252,310	42,610	40,914	—

Source: Bureau of Mines, United States Department of the Interior, Washington, D. C.

U.S.A. Rubber Industry Sales and Inventories

(Millions of Dollars)

	Value of Sales*				Manufacturers' Inventories*			
	1956	1957	1958	1959	1956	1957	1958	1959
Jan.	415	496	448	508	935	1,047	1,100	1,013
Feb.	445	495	413	490	970	1,036	1,087	1,032
Mar.	451	476	412	506	979	1,030	1,112	1,030
Apr.	445	490	429	543	970	1,031	1,047	1,015
May	464	481	428	524	985	1,024	1,020	995
June	450	458	445	520	975	1,027	986	1,013
July	459	514	478	519	987	1,045	980	1,075
Aug.	436	481	438	505	1,007	1,074	1,024	1,077
Sept.	429	481	464	...	1,007	1,074	1,024	....
Oct.	454	490	493	...	1,022	1,097	1,022	....
Nov.	463	431	472	...	1,024	1,101	1,018	....
Dec.	461	427	518	...	998	1,092	994	....
Total	5,372	5,720	5,438	...	Av. 988	12,678	12,414	....

* Adjusted for seasonal variation.

Source: Office of Business Economics, United States Department of Commerce.

U.S.A. Rubber Industry Economic Indicators

	Production Index*					% Return †			
						On Sales		Investment On	
Year	All Rubber Products	Total Tires & Tubes	Auto Tires	Truck & Bus Tires	Miscellaneous Rubber Products	R	R&MP‡	R	R&MP
1958	125	113	120	103	136	3.9	3.5	7.3	7.0
Sept.	137	117	122	109	156	4.5	4.4	9.2	9.2
Oct.	143	129	131	125	156				
Nov.	145	128	131	124	160				
Dec.	137	128	132	122	146	4.5	3.9	9.6	8.4
1959									
Jan.	150	138	149	124	161				
Feb.	158	154	167	137	161				
Mar.	159	155	171	133	163		3.9		8.0
Apr.	138	111	120	99	163				
May	132	108	120	92	154				
June	152	141	154	122			4.4		10.4
July	141	147	162	125					

* F.R.B. Index of Industrial Production Unadjusted (1947-49 Avg., 100%).

† Base Data F.T.C.-S.E.C.-Quarterly Financial Reports—% Calculated by RMA.

‡ R = Rubber; R&MP = Rubber and Miscellaneous Plastics, a classification revised according to the 1959 Standard Industrial Classifications.

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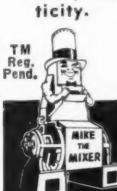

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U.S.A. Rubber Industry Employment, Wages, Hours

Year	Production Workers (1000's)	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings	Consumer's Price Index
		All Rubber Products			
1939	121.0	$27.84	39.9	$0.75	
1958					
Mar.	184.0	87.02	38.0	2.29	123.5
Apr.	176.0	85.88	37.5	2.29	123.6
May	172.3	87.86	38.2	2.29	123.7
June	175.8	91.10	39.1	2.33	123.9
July	175.1	91.89	39.2	2.35	123.7
Aug.	181.2	96.80	40.5	2.39	123.7
Sept.	187.5	97.51	40.8	2.39	123.7
Oct.	194.5	97.27	40.7	2.39	123.7
Nov.	195.3	98.09	40.7	2.41	123.9
Dec.	198.2	102.66	41.9	2.45	123.7
1959					
Jan.	199.1	100.28	41.1	2.44	123.8
Feb.	198.8	101.09	41.6	2.43	123.7
Mar.	201.5	103.74	42.0	2.47	123.7
Apr.	176.0	101.57	41.8	2.43	123.9
May	174.3	101.52	42.3	2.40	124.5
June	198.6	98.74	38.5	2.43	124.9
July	199.2	107.75	43.1	2.50	124.8
		Tires and Tubes			
1939	54.2	$33.36	35.0	$0.96	
1958					
Mar.	76.0	98.05	37.0	2.65	
Apr.	72.1	95.67	36.1	2.65	
May	70.4	99.48	37.4	2.66	
June	71.2	103.63	38.1	2.72	
July	71.0	106.59	38.9	2.74	
Aug.	72.5	113.96	40.7	2.80	
Sept.	74.1	113.40	40.5	2.80	
Oct.	75.3	113.24	40.3	2.81	
Nov.	76.2	115.75	40.9	2.83	
Dec.	77.1	121.40	42.3	2.87	
1959					
Jan.	76.9	117.55	41.1	2.86	
Feb.	76.2	118.98	41.6	2.86	
Mar.	77.9	122.96	42.4	2.90	
Apr.	66.0	123.98	42.9	2.89	
May	50.5	128.77	43.8	2.94	
June	73.0	108.93	34.0	2.94	
July	74.8	132.46	44.6	2.97	
		Rubber Footwear			
1939	14.8	$22.80	37.5	$0.61	
1958					
Mar.	16.7	76.61	39.9	1.92	
Apr.	16.5	75.46	39.3	1.92	
May	16.3	75.85	39.3	1.93	
June	16.3	77.20	40.0	1.93	
July	15.9	75.25	39.4	1.91	
Aug.	16.4	77.18	40.2	1.92	
Sept.	16.8	76.62	39.7	1.93	
Oct.	17.1	77.01	39.9	1.93	
Nov.	17.2	77.22	39.6	1.95	
Dec.	17.1	78.01	39.8	1.96	
1959					
Jan.	17.1	78.20	39.9	1.96	
Feb.	17.1	80.59	40.7	1.98	
Mar.	17.4	79.79	40.3	1.98	
Apr.	12.9	73.05	39.7	1.84	
May	18.4	79.98	40.6	1.97	
June	18.3	81.58	40.8	1.97	
July	18.2	78.78	40.4	1.95	
		Other Rubber Products			
1939	51.9	$23.34	38.9	$0.61	
1958					
Mar.	91.3	79.87	38.4	2.08	
Apr.	87.4	79.87	38.4	2.08	
May	85.6	80.29	38.6	2.08	
June	88.3	83.77	39.7	2.11	
July	88.2	83.53	39.4	2.12	
Aug.	92.3	86.24	40.3	2.14	
Sept.	96.6	89.21	41.3	2.16	
Oct.	102.1	88.78	41.1	2.16	
Nov.	101.9	88.54	40.8	2.17	
Dec.	104.0	92.60	41.9	2.21	
1959					
Jan.	105.1	91.27	41.3	2.21	
Feb.	105.5	91.96	41.8	2.20	
Mar.	106.2	93.02	41.9	2.22	
Apr.	97.1	90.03	41.3	2.18	
May	105.4	92.60	41.9	2.21	
June	107.3	94.98	41.2	2.22	
July	106.2	95.85	42.6	2.25	

Source: BLS, United States Department of Labor.

U.S.A. Automotive Pneumatic Casings

(Thousands of Units)

Year	Shipments: Original Equipment	Shipments: Replacement	Shipments: Export	Shipments: Total	Production	Inventory End of Period
Passenger Car						
1958						
Aug. . .	847	5,807	57.2	6,711	6,753	15,535
Sept. . .	1,170	5,425	63.9	6,659	7,134	16,045
Oct. . .	1,522	5,369	80.6	6,972	7,983	17,134
Nov. . .	3,056	3,651	57.7	6,765	7,182	17,420
Dec. . .	3,701	3,977	61.2	7,739	8,046	17,818
1959						
Jan. . .	2,631	6,028	56.9	8,716	8,859	17,998
Feb. . .	2,442	4,932	60.2	7,434	8,962	19,435
Mar. . .	2,930	6,261	61.7	9,253	9,959	20,181
Apr. . .	3,115	6,390	64.8	9,569	6,986	17,597
May . .	2,848	5,617	38.4	8,504	6,953	15,721
June . .	2,904	5,936	46.3	8,886	9,022	16,134
July . .	3,188	5,988	65.4	9,242	9,857	16,853
Aug. . .	973	5,721	67.3	6,761	8,458	18,677
Sept. . .	1,923	5,850	77.4	7,850	8,804	19,636
Truck and Bus						
1958						
Aug. . .	208	871	57	1,136	1,009	2,986
Sept. . .	273	940	41	1,253	1,143	2,880
Oct. . .	316	1,106	59	1,482	1,361	2,779
Nov. . .	313	669	42	1,023	1,211	2,983
Dec. . .	356	734	63	1,153	1,330	3,171
1959						
Jan. . .	329	714	47	1,090	1,325	3,401
Feb. . .	364	679	74	1,117	1,308	3,584
Mar. . .	406	842	56	1,304	1,391	3,680
Apr. . .	479	907	44	1,430	1,039	3,276
May . .	442	738	41	1,222	943	3,006
June . .	488	820	44	1,352	1,272	2,954
July . .	400	844	47	1,290	1,366	3,023
Aug. . .	276	874	46	1,196	1,225	3,054
Sept. . .	422	969	58	1,448	1,299	2,906
Total Automotive						
1958						
Aug. . .	1,055	6,679	115	7,848	7,762	18,521
Sept. . .	1,442	6,365	105	7,912	8,277	18,925
Oct. . .	1,838	6,476	140	8,454	9,344	19,913
Nov. . .	3,369	4,320	100	7,788	8,393	20,403
Dec. . .	4,057	4,711	124	8,892	9,376	20,988
1959						
Jan. . .	2,961	6,742	104	9,806	10,184	21,399
Feb. . .	2,805	5,611	135	8,551	10,270	23,019
Mar. . .	3,336	7,103	117	10,557	11,350	23,862
Apr. . .	3,594	7,297	108	10,999	8,025	20,872
May . .	3,291	6,356	79	9,726	7,796	18,727
June . .	3,392	6,756	90	10,237	10,294	19,098
July . .	3,588	6,832	112	10,532	11,223	19,877
Aug. . .	1,249	6,595	114	7,957	9,683	21,730
Sept. . .	2,345	6,819	135	9,298	10,103	22,542

Source: The Rubber Manufacturers Association, Inc.

U.S.A. Automotive Inner Tubes

(Thousands of Units)

Year	Shipments: Original Equipment	Shipments: Replacement	Shipments: Export	Shipments: Total	Production	Inventory End of Period
1958						
Aug.	160	3,097	74	3,331	3,305	7,664
Sept.	207	3,228	63	3,498	3,390	7,657
Oct.	244	3,237	84	3,567	3,768	7,869
Nov.	264	2,575	60	2,899	3,319	8,372
Dec.	288	3,029	94	3,411	3,491	8,617
1959						
Jan.	287	4,450	63	4,800	3,806	7,536
Feb.	311	3,924	81	4,316	4,094	7,364
Mar.	339	4,013	83	4,435	4,459	7,629
Apr.	389	3,473	65	3,928	3,380	7,218
May	363	2,853	59	3,275	2,752	6,849
June	392	3,421	59	3,872	3,683	6,999
July	317	3,564	66	3,948	4,345	7,560
Aug.	210	3,297	77	3,583	3,716	7,848
Sept.	347	3,258	88	3,693	4,065	8,334

Source: The Rubber Manufacturers Association, Inc.

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